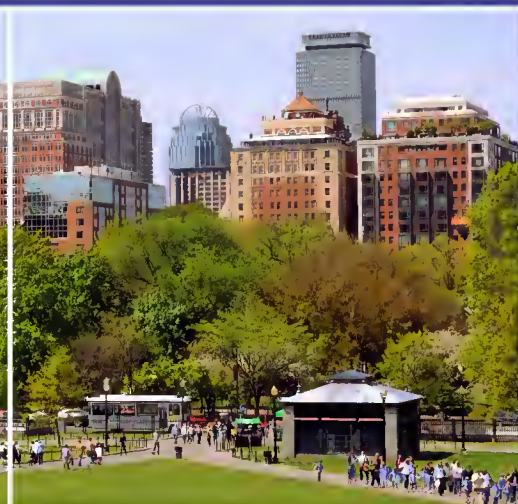




# Creating an Overall Environmental Quality Index

## Technical Report



Office of  
Research and Development

National Health and  
Environmental Effects  
Research Laboratory

Environmental Public Health Division



# CREATING AN OVERALL ENVIRONMENTAL QUALITY INDEX Technical Report

Environmental Public Health Division  
Epidemiology Branch  
Chapel Hill, North Carolina

### **Project Personnel**

Danelle T. Lobdell, U.S. Environmental Protection Agency (EPA), Office of Research and Development (ORD),  
National Health and Environmental Effects Research Laboratory (NHEERL)

Jyotsna Jagai, University of Illinois at Chicago, Oak Ridge Institute for Science and Education (ORISE) Faculty  
Grantee

Lynne C. Messer, Portland State University, Support Contractor

Kristen Rappazzo, University of North Carolina (UNC), Department of Epidemiology, ORISE Grantee

Shannon Grabich, UNC, Department of Epidemiology, ORISE Grantee

Christine L. Gray, UNC, Department of Epidemiology, ORISE Grantee

Kyle Messier, Student Services Contractor

Gence Smith, Student Services Contractor

Suzanne Pierson, Innovate!, Inc., Geographic Information Systems (GIS) Contractor Support

Barbara Rosenbaum, Innovate!, Inc., GIS Contractor Support

Mark Murphy, Innovate!, Inc., GIS Contractor Support

### **Acknowledgements**

#### *External Peer Reviewers*

Angel Hsu, Yale University, School of Forestry and Environmental Studies

Paul D. Juarez, University of Tennessee Health Science Center, Department of Preventive Medicine

Peter H. Langlois, Texas Department of State Health Services, Birth Defects Epidemiology and Surveillance Branch

#### *Internal Peer Reviewers*

Jane Gallagher, U.S. EPA, ORD, NHEERL

Thomas Brody, U.S. EPA, Region 5

Lisa Smith, U.S. EPA, ORD, NHEERL

This document has been reviewed by the U.S. Environmental Protection Agency, Office of Research and Development, and approved for publication. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

# Table of Contents

1.0 Overview of Report. . . . .	1
Background. . . . .	1
Purpose . . . . .	2
Conceptual Framework. . . . .	2
2.0 Domain Identification . . . . .	3
Approach. . . . .	3
Summary of Activities . . . . .	4
3.0 Data Source Identification and Review. . . . .	5
Approach. . . . .	5
<i>Data Selection</i> . . . . .	5
<i>Data Source Search</i> . . . . .	5
<i>Data Quality and Coverage Assessment</i> . . . . .	5
Summary of Activities . . . . .	6
<i>Air Domain.</i> . . . .	6
<i>Water Domain</i> . . . . .	6
<i>Land Domain</i> . . . . .	7
<i>Sociodemographic Domain</i> . . . . .	7
<i>Built-Environment Domain</i> . . . . .	7
4.0 Variable Construction . . . . .	11
Approach. . . . .	11
Summary of Activities . . . . .	12
<i>Domain-Specific Variable Descriptions</i> . . . . .	12
<i>Air Domain.</i> . . . .	12
<i>Water Domain</i> . . . . .	13
<i>Land Domain</i> . . . . .	14
<i>Sociodemographic Domain</i> . . . . .	15
<i>Built-Environment Domain</i> . . . . .	15
5.0 Data Reduction and Index Construction. . . . .	17
Overall Approach . . . . .	17
<i>Principal Component Analysis</i> . . . . .	17

Results. . . . .	18
<i>Description of Variables Comprising EQI Domains</i> . . . . .	18
<i>Air Domain.</i> . . . .	18
<i>Water Domain</i> . . . . .	26
<i>Land Domain</i> . . . . .	30
<i>Sociodemographic Domain</i> . . . . .	32
<i>Built Environment Domain</i> . . . . .	32
<i>Variable Loadings on EQI Domains.</i> . . . .	34
<i>Air Domain.</i> . . . .	34
<i>Water Domain</i> . . . . .	36
<i>Land Domain</i> . . . . .	38
<i>Sociodemographic Domain</i> . . . . .	39
<i>Built-Environment Domain</i> . . . . .	40
<i>Domain-Specific Index Description and Loadings on Overall EQI.</i> . . . .	40
<i>Description of Overall EQI.</i> . . . .	40
6.0 Discussion. . . . .	43
Uses of EQI. . . . .	43
Strengths and Limitations . . . . .	43
Other Environmental Indices . . . . .	45
Conclusions. . . . .	46
7.0 References. . . . .	47
Appendix I Modified Data Inventory . . . . .	A-1
Appendix II Identified Variables by Source for Each Domain . . . . .	B-1
Appendix III Table of Highly Correlated Variables for Each Domain . . . . .	C-1
Appendix IV County Maps of Environmental Quality Index . . . . .	D-1
Appendix V Quality Assurance. . . . .	E-1



# List of Tables

Table 1. Sources of Data for Air, Water, Land, Built-Environment, and Sociodemographic Domains for Use in the Environmental Quality Index . . . . .	8
Table 1. (continued) Sources of Data for Air, Water, Land, Built-Environment, and Sociodemographic Domains for Use in the Environmental Quality Index . . . . .	9
Table 1. (continued) Sources of Data for Air, Water, Land, Built-Environment, and Sociodemographic Domains for Use in the Environmental Quality Index . . . . .	10
Table 2. Selected Hazardous Air Pollutants from the National-Scale Air Toxics Assessment (1999, 2002, and 2005) Used in the Environmental Quality Index . . . . .	12
Table 3. Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified . . . . .	19
Table 3.(continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	20
Table 3.(continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	21
Table 3.(continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	22
Table 3.(continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	23
Table 3. (continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	24
Table 3. (continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	25
Table 4. Water Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	26
Table 4. (continued) Water Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	27
Table 4. (continued) Water Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	28
Table 4. (continued) Water Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	29

Table 5. Land Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	30
Table 5. (continued) Land Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified. . . . .	31
Table 6. Sociodemographic Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified . . . . .	32
Table 7. Built-Environment Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified . . . . .	33
Table 8. Variable Loadings—Air Domain . . . . .	34
Table 8. (continued) Variable Loadings—Air Domain. . . . .	35
Table 9. Variable Loadings—Water Domain . . . . .	36
Table 9. (continued) Variable Loadings—Water Domain. . . . .	37
Table 10. Variable Loadings—Land Domain . . . . .	38
Table 11. Variable Loadings—Sociodemographic Domain . . . . .	39
Table 12. Variable Loadings—Built-Environment Domain . . . . .	39
Table 13. Description of the Domain Indices Contributing to the Overall and Rural-Urban Continuum Codes (RUCCs) Stratified Environmental Quality Index for 3141 U.S. Counties (2000-2005) 40	40
Table 13. (continued) Description of the Domain Indices Contributing to the Overall and Rural-Urban Continuum Codes (RUCCs) Stratified Environmental Quality Index for 3141 U.S. Counties (2000-2005). . . . .	41
Table 14. Loadings of the Domain Indices Contributing to the Overall and Rural-Urban Continuum Codes (RUCCs) Stratified Environmental Quality Index for 3141 U.S. Counties (2000-2005). . . . .	41
Table 14. (continued) Loadings of the Domain Indices Contributing to the Overall and Rural-Urban Continuum Codes (RUCCs) Stratified Environmental Quality Index for 3141 U.S. Counties (2000-2005). . . . .	42



# List of Figures

Figure 1. Conceptual environmental quality—hazardous and beneficial aspects. . . . .	1
Figure 2. Rural-urban continuum code (RUCC) stratification for all counties in the United States. . . . .	18
Figure 3. Principal component analysis concept for Environmental Quality Index. Performed for all counties and each of the four strata of the rural-urban continuum (RUCC) codes. . . . .	19
Figure 4. Distribution of overall EQI scores across rural-urban continuum code (RUCC) categories. . . .	42

# List of Maps

Map 1. Overall Environmental Quality Index by County, 2000-2005 . . . . .	D-1
Map 2. Air Domain Index by County, 2000-2005 . . . . .	D-2
Map 3. Water Domain Index by County, 2000-2005* . . . . .	D-2
Map 4. Land Domain Index by County, 2000-2005 . . . . .	D-1
Map 5. Sociodemographic Domain Index by County, 2000-2005* . . . . .	D-1
Map 6. Built Domain Index by County, 2000-2005 . . . . .	D-2
Map 7. Overall Environmental Quality Index Stratified by Rural Urban Continuum Codes by County, 2000-2005 . . . . .	D-3
Map 8. Air Domain Index Stratified by Rural Urban Continuum Codes by County, 2000-2005* . . . . .	D-3
Map 9. Water Domain Index Stratified by Rural Urban Continuum Codes by County, 2000-2005 . . . .	D-4
Map 10. Land Domain Index Stratified by Rural Urban Continuum Codes by County, 2000-2005* . . .	D-4
Map 11. Sociodemographic Domain Index Stratified by Rural Urban Continuum Codes by County, 2000-2005 . . . . .	D-5
Map 12. Built Domain Index Stratified by Rural Urban Continuum Codes by County, 2000-2005* . . .	D-5



# List of Acronyms

ACRES	Assessment, Cleanup, and Redevelopment Exchange
AQS	Air Quality System
ccc	Concordance correlation coefficients
CI	Confidence interval
CO	Carbon monoxide
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
EPI	Environmental Performance Index
EQI	Environmental Quality Index
ESI	Environmental Sustainability Index
EVI	Environmental Vulnerability Index
FBI UCR	Federal Bureau of Investigation Uniform Crime Report
GIS	Geographic information systems
HAP	Hazardous air pollutant
NATA	National-Scale Air Toxics Assessment
NCOD	National Contaminant Occurrence Database
NGS	National Geochemical Survey
NPDES	National Pollutant Discharge Elimination System
NPUD	National Pesticide Use Database
PCA	Principal component analysis
PM	Particulate matter
PM <sub>2.5</sub>	Particulate matter below 2.5 µm in aerodynamic diameter
PM <sub>10</sub>	Particulate matter below 10 µm in aerodynamic diameter
RAD	REACH Address Database
RCRA	Resource Conservation and Recovery Act
ROE	Report on the Environment
RUCC	Rural-urban continuum code
SD	Standard deviation
TIGER	Topologically Integrated Geographic Encoding and Referencing
WATERS	Watershed Assessment, Tracking, and Environmental Results
WQS	Water quality standards



# 1.0

## Overview of Report

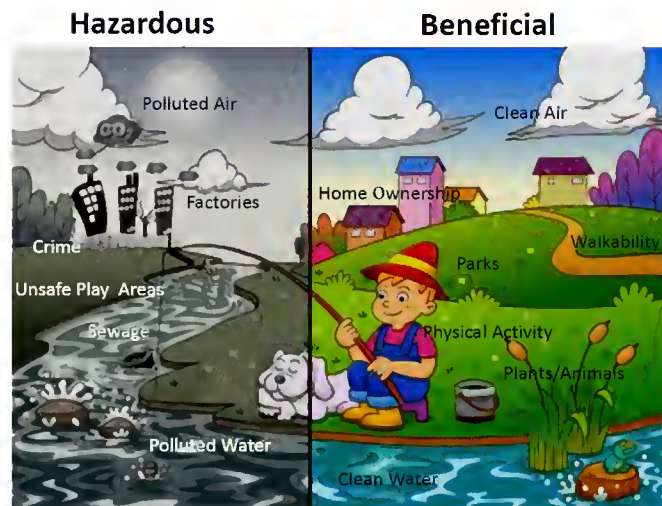
A better estimate of overall environmental quality is needed to improve the understanding of the relationship between environmental conditions and human health. This report describes the effort to construct an environmental quality index representing multiple domains of the ambient environment, including air, water, land, built, and sociodemographic, for all counties in the United States for the 2000-2005 period. The Environmental Quality Index (EQI) was created for two main purposes: (1) as an indicator of ambient conditions/exposure in environmental health modeling and (2) as a covariate to adjust for ambient conditions in environmental models. However, as detailed in the discussion of this report, the EQI can be adapted and used for other objectives. The EQI was developed in four parts: (1) domain identification, (2) data source identification and review, (3) variable construction, and (4) data reduction. Each of these four areas represents a chapter in the report, where detailed information is provided on the development of the EQI. The methods applied provide a reproducible approach that capitalizes almost exclusively on publicly available data sources.

This report is written for audiences interested in the construction of the EQI and is technical in nature. The created variables, EQI, domain-specific indices, and EQI stratified by rural-urban continuum codes (RUCCs) are available publicly at the U.S. Environmental Protection Agency's (EPA's) Environmental Dataset Gateway. Also, an interactive map of the EQI is available at EPA's GeoPlatform.

### Background

The assessment of environmental exposures for human health is an advancing field, characterized by multiple new methodologic and analytic approaches. The difficulties in examining the many broad-based factors impacting human health outcomes are increasingly recognized, with exposures to harmful and benign substances occurring simultaneously. For instance, it is understood that environmental exposures tend to cluster; environmental disamenities, such as landfills or industrial plants, often are located in neighborhoods with a high percentage of minority and poor residents.<sup>1-7</sup> Conversely, high-income neighborhoods frequently contain amenities conducive to promoting and maintaining optimal health, such as parks, health clubs, and well-stocked grocery stores.<sup>8,9</sup> Yet, it is unlikely that any single exposure alone is responsible for good or poor health. Each exposure estimated in epidemiologic models accounts for a relatively small proportion of observed variance in health outcomes. Clearly, it is not just good-quality air or high income that produces health but, rather, the combination of these and other various exposures or health-related variables.

### ENVIRONMENTAL QUALITY



**Figure 1. Conceptual environmental quality—hazardous and beneficial aspects.**

One limitation to current approaches in environmental research is their focus on single exposure categories. For instance, an environmental scientist investigating the effects of pesticides on women's reproductive health may control for individual-level education or income but exclude information related to the water and air quality to which the women are exposed simultaneously. These other environmental factors are not excluded because the data are unavailable but out of disciplinary boundaries and a lack of statistical power to include multiple covariates in most statistical models. Well-designed environmental studies need to balance collecting a sufficient depth of high-quality and expensive data against the breadth, or number, of people on whom data can be collected. This trade-off frequently results in studies comprising a relatively small number of participants for whom a few high-quality exposure measures are taken. Under these circumstances, it is statistically impossible to include additional variables representing the host of exposures that study participants might experience, in addition to the main exposures of interest.

A scale or index produced through data reduction approaches could be used to help improve statistical efficiency, while simultaneously summarizing information on the wider environment to which humans are exposed. The resulting scale or index, hereafter referred to as the "Environmental Quality Index" or "EQI", could be used to identify geographies characterized by varying quantities of environmental disamenities. The clustering of adverse environmental exposures into unhealthy places could be identified and associated with health outcomes. The EQI,

which would constitute a single item, could also be included as a covariate in statistical models assessing the effects of a specific exposure (e.g., water quality) on a specific health outcome.

## Purpose

A better estimate of overall environmental quality is needed to improve the understanding of the relationship between environmental conditions and human health. The EQI was developed for all counties in the United States using indicators from the chemical, natural, built, and social environments. Included were five environmental domains: air, water, land, built and sociodemographic. The EQI is anticipated to be used in two primary ways: (1) as an indicator of ambient conditions/exposure in environmental health modeling and (2) as a covariate to adjust for ambient conditions in environmental models. However, other uses of the data are expected by different end users such as local, county, State, and Federal governments, nongovernmental organizations, and academic institutions.

## Conceptual Framework

The underlying purpose of the EQI is to quantify overall environmental quality that encompasses where humans interact and may impact human health (see Figure 1). To achieve that, a conceptual framework was developed to explicitly represent traditional environmental domains (air, water, and land), as well as the socially structured environment, such as neighborhood poverty or fast-food restaurants that are known to be important to human health. Consultation with health experts, as well as literature review, ultimately resulted in the grouping of these social-environmental constructs into two separate domains: (1) the built and (2) sociodemographic environments.

Conceptually, the explicit identification of these five specific domains, each based on evidenced associations with human health, served two purposes: (1) It provided a guiding framework for a more complete definition of the environment as it relates to human health, and (2) it enabled a targeted search for specific variables that represented each domain, which could be used in the estimation of environmental quality. These domains, comprising chemical, natural, built, and sociodemographic environments, would include both positive- and negative-health influences. As a result, the EQI could be used to examine both adverse health outcomes and protective health events. More detailed methods for selecting each domain are described in Part 1.



## 2.0

# Domain Identification

### Approach

#### *Review of Report on the Environment*

The EPA Report on the Environment (ROE)<sup>10</sup> served as the starting point for the EQI. Recognizing that specific geographies were exposed simultaneously to poor environmental conditions, the media chapters (on air, water, and land) from the ROE were consulted to identify domains, data sources, and variables for inclusion in the EQI.

#### *Literature Review*

Following the ROE consultation, the team undertook a more extensive review of environmental associations with human health. Searching for all possible human health outcomes was not feasible. To facilitate a targeted search that would help identify broad-based key environmental constructs, the team included a search with infant mortality as an indicator of national health and well-being. Infant mortality has several unique features that make it a helpful outcome to represent human health: Relative to other outcomes, it is very consistently measured, well-studied, and broadly considered a primary indicator of population human health. The literature review was conducted in PubMed, a service of the U.S. National Library of Medicine and the National Institutes of Health. Searching began with the broad term of “environment and infant mortality,” followed by more focused searches using the domains identified through the ROE review and further searching on specific environmental indicators revealed through the literature review search process. For instance, after searching under “air environment and infant mortality,” one would find literature assessing carbon monoxide (CO), particulate matter (PM), ozone, etc. These references were explored from the main papers, defined as “those that come up repeatedly in the various searches,” to make sure seminal papers, environmental indicators, or subdomains or domains had not been missed.

#### *Expert Consultation*

Adverse environmental exposures have been associated with social exposures. To ensure the social environment was part of the environment considered by the EQI, expert consultation was sought from a social epidemiologist. Other experts were approached, both one on one (e.g., face-to-face meetings, telephone conversations, etc.), as well as at professional meetings and environmental justice workshops. Initially, the built-environment variables were considered part of the sociodemographic domain. However, after consulting with scientists and community members at the EPA-sponsored symposium on Environmental Justice in March 2010,<sup>11</sup> the built environment was developed as a separate domain. These interactions, in addition to studies observed in the literature review, supported a broader EQI definition of “environment.”

#### *Overview of the Five Domains*

Based on the above approach, five environmental domains were identified: (1) air, (2) water, (3) land, (4) built, and (5) sociodemographic. The air domain represents the ambient air environment. Two traditional air pollutant constructs were considered: (1) criteria air pollutants and (2) hazardous air pollutants (HAPs). Health effects linked to air pollutants include death, cancer, heart disease, respiratory disease, birth outcomes, and neurologic disorders.<sup>12-19</sup>

The water domain represents the overall water environment. Seven constructs were considered to represent water quality: (1) overall water quality, (2) general water contamination, (3) recreational water quality, (4) domestic use, (5) atmospheric deposition, (6) drought, and (7) chemical contamination. Several studies have demonstrated the association between particular water contaminants and pathogens and health outcomes. The range of health outcomes associated with water quality include gastrointestinal infection to cancer<sup>20,21</sup> In addition, water contamination with mercury and other chemicals has been associated with adverse birth outcomes<sup>22</sup>

The land domain represents the physical environment not covered by air or water. Five constructs were considered to represent land environmental quality: (1) agricultural environment, (2) pesticides, (3) facilities, (4) soil contaminants, and (5) radon potential. Health effects linked to land constructs include cancer, birth outcomes, birth defects, and asthma.<sup>23-25</sup>

The built-environment domain considered five constructs: (1) traffic-related environment, (2) transit participation and access, (3) pedestrian safety, (4) the various business environments (such as the food, recreation, health care, and educational environments), and (5) public housing. Each of these constructs has both direct and indirect influences on health that have been documented in prior research. For instance, neighborhoods with an abundance of fast-food restaurants or liquor stores have been associated with poorer health, whereas those with an abundance of protective factors like educational or physical activity resources have been associated with better health.<sup>26,27</sup> Traffic and pedestrian safety are important for health, and the presence of public housing has been associated with poor mental health.<sup>26</sup>

The literature review and expert consultation identified key constructs that were grouped into the sociodemographic domain: socioeconomic and crime. The association between sociodemographic factors and human health has been well-established over the past 40 years of research. For example, educational attainment and markers of poverty (income and neighborhood median income) have been linked to prevalent chronic diseases, such as obesity and cardio-vascular

disease, as well as acute conditions like sexually transmitted infections and influenza.<sup>28-30</sup> High-wealth neighborhoods, considered a protective factor, have been associated with good health. Similarly, neighborhood crime rates have been associated with mental health, increased human-immunodeficiency-virus-transmission and poor reproductive health outcomes.<sup>31, 32</sup>

### Summary of Activities

Three environmental domains were initially identified from the media chapters of the 2008 EPA ROE: (1) air, (2) water, and (3) land). All three were validated through an extensive literature search and, thus, were kept as domains for the EQI. The literature search also identified sociodemographic factors to be important. Thus, the sociodemographic domain was considered for inclusion.

To better assess the need for the sociodemographic domain, consultants were contacted and verified the need to include the sociodemographic domain in the EQI. Initially, the built-environment variables were considered part of the sociodemographic domain. However, after consultation with scientists and community members, the built environment was developed as a separate domain.

Thus, five environmental domains were identified and developed for the EQI: (1) Air, (2) Water, (3) Land, (4) Built, and (5) Sociodemographic.

## 3.0

# Data Source Identification and Review

### Approach

#### *Data Selection*

An index that comprehensively captures the total environment relating to human health requires numerous variables representing the full range of health-influencing exposures. From within each domain identified in the conceptual model, specific constructs or major areas were identified. For example, HAPs were a construct of the air domain. Once essential constructs were identified, data sources needed to be located that contained variables representing those constructs. For instance, data sources with variables estimating HAPs were sought to represent the HAP construct within the air domain. Similarly, neighborhood poverty was identified as a construct contained within the sociodemographic domain; therefore data sources containing the variable “percentage of persons living below the poverty line” was sought to represent this construct for this domain.

The majority of variables were identified a priori. In a few cases, the data source search for one variable led to the discovery of another variable that was not identified explicitly before searching for data sources but was known to be associated with human health. For instance, in locating the percentage of roads within a county that were highways (roadways construct of the built domain), it became apparent that pedestrian fatalities was another important construct representing the built domain with obvious implications for human health. Therefore, the pedestrian safety construct was included in the built domain, and data sources to represent pedestrian safety were sought.

#### *Data Source Search*

Once the desired constructs were identified, the research team conducted an extensive search for potential sources with those data. In general, a broad approach to searching for data sources was undertaken to

- identify EPA and non-EPA domain-specific environmental data sources for all counties in the 50 States of the United States;
- summarize environmental data source availability, quality, spatial and temporal coverage, storage requirements, and acquisition steps; and
- obtain the identified data.

Possible data sources were identified using Web-based search engines (e.g., Google), site specific search engines (e.g., Federal and State data sites), literature-reported data sources (e.g., PubMed, ScienceDirect, TOXNET), and personal communications from data owners. Data that were

available at—or had the potential to be aggregated to—the United States county level were sought. Data were restricted to the years 2000–2005 to coincide with the available sociodemographic and health data to be used for initial testing of the EQI. For each data source identified, the following information (when available) was collected: data title, source URL (uniform resource locator), data description, data ownership, data provider, data format, secondary data format, data geometry, geographic coverage, smallest geographic unit represented, data resolution, record start and end years, date data published, data refresh frequency, metadata availability, metadata link/location, method to obtain data, point of contact information, data constraints, and data limitations. Within each domain, a database containing information on each identified dataset was compiled. A sample version of the data inventory (reflecting all sources identified but not all information on the source) is located in Appendix I of this report and the full data inventory can be downloaded from EPA’s [Environmental Dataset Gateway](#).

#### *Data Quality and Coverage Assessment*

Once potential data sources were identified, several criteria were used in the assessment of sources for inclusion in the EQI. First, constructs representing the domain were identified. Data sources were evaluated as to whether or not variables could be developed to be included to represent the construct. If a data source could provide variables for a construct in the domain, then the next two critical criteria used to evaluate data sources for use in the EQI were (1) data quality and (2) coverage. Data sources of the highest quality were sought. Quality was assessed by the data source managers, in data reports and internal documentation; project investigators; and the larger field of environmental research through use and critique of the various data sources. Data quality concerns were weighted against data coverage. Often, it was relatively straightforward to achieve high-quality data on a few individuals or a small geographic area. However, the extent of the data coverage was also very important, as all counties (N=3141) in all 50 States were required to be represented. The best data sources would have had spatial data available across the entire United States, including Hawaii and Alaska. The ability for the data to be aggregated at the county level was also a factor for inclusion (e.g., average of point measures or census tract values). Temporally, ideal sources would have had data at least annually for the 2000–2005 period. At minimum, at least some data must have fallen within the 2000–2005 period. In theory, a “perfect” data source would have variable measurements at high temporal and spatial resolutions. In practice, data often met one but not both criteria, and evaluation of trade-off values was required, along with



consideration of data quality. Redundant data sources that were determined to meet the criteria for inclusion but were not selected for inclusion were retained for use in sensitivity analyses.

## Summary of Activities

Table 1 identifies the data sources that were acquired and used for the construction of the EQI, and it includes a description of the data source and provides strengths and limitations. Domain-specific information about the number of data sources was identified, and reasons for exclusions are summarized below.

All evaluated datasets are listed in the data inventory in Appendix I. The inventory includes an indicator for whether the dataset was included in the EQI or not. If a dataset was not included in the EQI, a reason for exclusion is provided in the inventory listing. If a data source was utilized for sensitivity analysis, that also is indicated.

### *Air Domain*

Three data categories were considered: (1) monitoring data, (2) emissions data, and (3) modeled estimates representing concentrations of either criteria air pollutants or toxics or HAPs. Twelve data sources were identified, and seven were considered for inclusion. Ultimately, the two identified as the most complete were chosen for use in the EQI air domain.

The Air Quality System (AQS)<sup>33</sup> is a repository for criteria ambient air pollution data collected by Federal, State, local, and tribal agencies from thousands of monitors for the EPA's ambient air monitoring program across the United States. Monitored pollutants include all criteria air pollutants, PM species, and approximately 60 ozone precursors. Major strengths of the AQS are that data are measured, rather than modeled, and these measurements are synchronized across the country. Monitors in the network and the reported data are audited regularly for accuracy and precision. However, most of the ambient air monitors are located in or near urban areas, leaving many U.S. counties without reported data. In addition, the AQS provides sparse and limited data collection for HAPs.

The National-Scale Air Toxics Assessment (NATA) database<sup>34</sup> uses data from the National Emissions Inventory to construct air dispersion models for estimating ambient concentrations of HAPs at the county and census-tract levels. Beginning in 1996, the National Emissions Inventory data are constructed every 3 years, providing annual estimates. The NATA databases contain estimated ambient concentrations for 177 to 180 of the 187 HAPs and use validated models that take meteorology and chemical dispersion into account. The methodology for estimating concentrations may change between assessments, but these modifications are well-documented and justified. Although the ambient concentrations may be comparable over time, some differences between estimates are attributable to these minor methodological modifications. The temporal resolution of the assessments is adequate for the intended EQI, but, because of the 3-year release schedule, there are gaps in temporal coverage.

### *Water Domain*

Five broad data categories within the water domain were identified: (1) modeled, (2) monitoring, (3) reported, (4) surveyed/studied, (5) and miscellaneous data. Eighty data sources were identified. Five, which met selection criteria and provided data to represent the water domain, were selected for use in the EQI, and three, which provided duplicate data, were selected as part of sensitivity analysis.

The Watershed Assessment, Tracking, and Environmental Results (WATERS) Program<sup>35</sup> database represents the surface water assessment programs under the Clean Water Act (CWA). A limitation of this data source is that data are maintained at the State level and reported to the Federal system. Although all States report county-level data, there is little consistency in the temporal reporting and type of data reported across States. These data were first geocoded to a specific stream length in the National Hydrography Dataset via the REACH Address database (RAD). The geocoded WATERS Program data were used to calculate human-exposure-related variables, such as percentage of stream length impaired for recreational use. This dataset is the only database maintaining information on EPA CWA regulations, which is a strength.

The National Contaminant Occurrence Database (NCOD)<sup>36</sup> is a surveillance database maintained to satisfy the requirements of the Safe Drinking Water Act. This database includes information on contaminants in public water supplies that are not measured elsewhere. The survey is conducted every 6 years, and data are provided by public water suppliers. The data are limited as they are provided by public water suppliers, and, therefore, spatial aggregation was needed to get county-level estimates. Estimated Use of Water in the United States,<sup>37</sup> which is modeled by the U.S. Geological Survey, provided county-level estimates of water withdrawals (an indication of water stress in a county) for domestic, irrigation, livestock, and industrial use. This dataset already is provided at the county level, which is a strength. However, it is limited as the estimates are based on several different data sources.

Two data sources provided information on meteorological impacts on water quality. The Drought Monitor Data<sup>38</sup> are modeled weekly drought conditions. Weekly coverage for the entire country is a strength of this dataset; however, it is limited, as the data are modeled raster data, which required spatial aggregation to achieve county-level estimates. The National Atmospheric Deposition Program (NADP)<sup>39</sup> provided weekly measures and national coverage of the deposition of various pollutants from rainfall using monitors around the country. Again, this database provided weekly information for the entire country; however, it was reported by monitors and required spatial aggregation to achieve county-level estimates.

Two data sources were used for sensitivity analyses. These two data sources are repositories maintained for compliance with Federal regulations. They were categorized as "miscellaneous" because they include monitored, reported, and surveyed/studied data. The National Water Information

System,<sup>40</sup> a repository maintained by the U.S. Geological Survey, includes monitoring data from streams. The Safe Drinking Water Information System<sup>41</sup> contains information from public water systems and violations of EPA's drinking water regulations. The number and type of violations reported by each water supply were calculated using this database. Both repositories include several measures of water quality; however, few have the spatial and temporal coverage required for the EQI. Additionally, the data maintained in these repositories are represented in other datasets. Therefore, selected data from both repositories were used for sensitivity analysis.

The Nutrient Loss Database for Agricultural Fields<sup>42</sup> provided information on agricultural impacts on water quality. This database only provides information on nutrients in areas with dense agriculture and does not provide national-level coverage. These data may be considered in the future for regional-level versions of the EQI or for sensitivity analyses; however, they were not useable for the national-level index development.

#### ***Land Domain***

Land domain data sources were grouped into four categories: (1) agriculture, (2) industrial facilities, (3) geology and mining, and (4) land cover. Eighty sources were identified, of which 11 were retained: 2 from agriculture, 7 from facilities, and 2 from geology/mining. An additional source from agriculture was identified for sensitivity analysis. None of the land cover data sources were retained. Future versions of the EQI will explore these data sources.

The three agricultural data sources considered for inclusion in the EQI were (1) the National Pesticide Use Database (NPUD) 2002,<sup>43</sup> (2) the 2002 Census of Agriculture Full Report,<sup>44</sup> and (3) the Dun and Bradstreet Agriculture Data.<sup>45</sup> The NPUD provides State-level rates of pesticide use. A significant limitation of the NPUD involved the resolution of data, as this database has State-level rates of pesticide use and is only available for contiguous States. The Census of Agriculture data provided mostly farm-related summary characteristics and did not offer direct pesticide measures or probable exposure information. As a strictly environmental indicator, the Census of Agriculture was useful, but its ability to link to human health was somewhat limited. Because no single database provided complete coverage or information, the NPUD and 2002 Census of Agriculture were used to estimate county-level pesticide use. Crop acres for corn, oats, potatoes, soybeans, and wheat were multiplied by individual pesticide State application rates (pounds per acre) for specific crop type and then summed by pesticide class to estimate pounds of pesticide class applied per county. The Dun and Bradstreet agricultural data are similar to the Census of Agriculture data, with many of the same strengths and limitations. Therefore, these data will be used for *sensitivity analyses*.

The industrial facilities data sources included the EPA Geospatial Data Download Service;<sup>46</sup> the Superfund National Priorities List sites;<sup>47</sup> the Resource Conservation and

Recovery Act (RCRA) Treatment, Storage, and Disposal and Corrective Action Facilities;<sup>48</sup> the RCRA Large Quantity Generators;<sup>49</sup> Toxic Release Inventory sites;<sup>50</sup> Assessment, Cleanup, and Redevelopment Exchange (ACRES) Brownfield sites;<sup>51</sup> and the Section Seven Tracking System Pesticide Producing site locations.<sup>52</sup> All facilities-related data were retained for inclusion in the EQI with extensive information on each facility for the years 2000-2005.

The two geology/mining data sources were National Geochemical Survey (NGS)<sup>53</sup> and the Map of Radon Zones.<sup>54</sup> The NGS data provided the mean and standard deviations for multiple soil chemicals. However, these values were calculated from multiple surveys of soil samples collected over several years based on local agencies interests and resources and, therefore, were combining many varying sources of data. No particular sampling strategy was employed in the collection of these data. The radon map assigned a radon potential level to each county in the United States. As the data source provided radon potential, not actual measurement, these data were limited. The three-level radon categorization masked important radon-level heterogeneity across the United States. Despite these limitations, both of these data sources provided land-related data not available elsewhere.

#### ***Sociodemographic Domain***

Few sociodemographic data sources were available at the county level. Only two data sources were identified and retained for sociodemographic data: (1) the U.S. Census Bureau<sup>55</sup> and (2) the Federal Bureau of Investigation Uniform Crime Reports (FBI UCRs).<sup>56</sup> The U.S. Census reports county-level population and housing characteristics, including population density, race, spatial distribution, socioeconomic characteristics, home and neighborhood features, and land use. One strength of this data source is its national coverage and consistency of data collection with standard methods. One weakness of this data source is its decennial collection. The FBI UCR provides annual violent and property crime counts and rates for reporting areas. These data are a valuable source of crime exposure, but reporting is not mandatory and may vary by jurisdiction. Each of these data sources represents critical aspects of the human sociodemographic environment, is updated regularly, and is available at the county-level for the entire country.

#### ***Built-Environment Domain***

Built-environment data sources were grouped by topic: traffic-related, transit access, pedestrian safety, access to various business environments (such as food, recreation, health care, and educational environments) and household health measures. Twelve data sources were identified, and four were retained: one each for traffic-related, pedestrian-safety, use in various business environments (physical activity, food, health care, and educational), and urban/rural residence. Because of the noncomparable county-level data quality, none of the transit access or household health measures were retained.



For the traffic-related data source, Topologically Integrated Geographic Encoding and Referencing (TIGER)<sup>57</sup> was retained. The TIGER files provide relatively uniform and nationwide coverage. From these files, county-specific proportions were characterized for various road types. Unfortunately, considerable heterogeneity may be lost; for instance, a tertiary road in Maryland may not be qualitatively equivalent to one located in Wyoming.

The Fatality Annual Reporting System of the National Highway Safety Commission<sup>58</sup> was retained as part of pedestrian safety because of its national coverage. The data are regularly updated and available from the Web site. A limitation of these data is that pedestrian fatalities result from diverse types of events (e.g., from crossing busy intersections or deserted highways), but this diversity is not well-captured.

North American Industry Classification System codes through Dun and Bradstreet<sup>45</sup> were used as the data source to estimate three different topics: (1) physical activity, (2) food, and (3) educational environments. These data are available as geocoded business addresses. Although these data have sometimes been criticized for inadequate spatial resolution (e.g., inaccurate geocoding to small units of aggregation like census tracts),<sup>59</sup> they should be sufficient as a construct for county-level food, physical activity, and educational environments.

The Housing and Urban Development database<sup>60</sup> includes data on Section 8 and low-income housing. These housing units are a unique feature of built environments associated with known and suspected health risks and disamenities.

## Summary

After consideration and evaluation of the available databases, datasets for derivation were limited to the following.

- Two data sources for the air domain representing criteria pollutants and HAPs
- Five data sources for the water domain representing overall water quality, general water contamination, recreational water quality, domestic use, atmospheric deposition, drought, and chemical contamination
- Eleven land data sources representing agricultural exposures, pesticides, soil contamination, large industrial facilities (for which the seven original data sources were combined into one data source), and elevated indoor radon
- Two data sources to represent the sociodemographic domain and the crime and socioeconomic environments
- Four data sources in the built domain representing the housing environment, traffic safety, public transportation usage, road properties, and the business and service environments

**Table 1. Sources of Data for Air, Water, Land, Built-Environment, and Sociodemographic Domains for Use in the Environmental Quality Index**

Air Domain			
Source of Data	Description	Strengths	Limitations
Air Quality System[33]	Repository of ambient air quality data, including both criteria and hazardous air pollutants (HAPs)	Measured values; network of criteria air pollutant monitors is substantial; measurement occurs regularly and is synchronized; data are audited for accuracy and precision.	The HAP network is sparse; some counties have no monitors, necessitating interpolation of concentrations for unmonitored locations.
National-Scale Air Toxics Assessment[34]	Estimates of HAP concentrations using emissions information from the National Emissions Inventory and meteorological data input into the Assessment System for Population Exposure Nationwide model	Validated models; coverage for all U.S. counties; majority of HAPs included.	Data are available at 3-year intervals; may underestimate concentrations; uses simplifying assumptions when information is missing or of poor quality; changes in methodology may result in different estimates between years.



**Table 1. (continued) Sources of Data for Air, Water, Land, Built-Environment, and Sociodemographic Domains for Use in the Environmental Quality Index**

<b>Water Domain</b>			
<b>Source of Data</b>	<b>Description</b>	<b>Strengths</b>	<b>Limitations</b>
Watershed Assessment, Tracking and Environmental Results Program Database/REACH Address Database[61]	Collection of EPA water assessments programs, including impairment, water quality standards, pollutant discharge permits and beach violations	Only database maintaining information on EPA Clean Water Act regulations	Data maintained and provided by States and, therefore, difficult to compare across States and not consistently reported with respect to temporal reporting and type of data reported across States.
National Contaminant Occurrence Database[36]	Samples both regulated and unregulated contaminants in public water supplies; maintained by EPA to satisfy statutory requirements for Safe Drinking Water Act	Provides measures for several chemicals and pathogens that are not measured elsewhere	Data provided by public water supplies; therefore, need to use spatial aggregation to get county-level estimates.
Estimates of Water Use in the United States[37]	County-level estimates of water withdrawals for domestic, agricultural, and industrial use calculated by the U.S. Geological Survey	County-level estimates	Estimated based on various data sources
Drought Monitor Data[38]	Geographic information systems raster files reporting weekly modeled drought conditions. A collaboration that includes the National Atmospheric and Oceanic Administration, the U.S. Department of Agriculture, and academic partners.	Weekly coverage for the entire country	Modeled data; raster data, therefore, required spatial aggregation.
National Atmospheric Deposition Program[39]	Measures deposition of various pollutants, such as calcium, sodium, potassium, and sulfate, from rainfall	Weekly coverage for the entire country	Data not at the county level and required spatial interpolation.
<b>Land Domain</b>			
<b>Source of Data</b>	<b>Description</b>	<b>Strengths</b>	<b>Limitations</b>
National Pesticide Use Database: 2002[43]	Delineates State-level pesticide usage rates for cropland applications; contains estimates for active ingredients, of which 68 are insecticides, and 22 are other pesticides.	Provides a measure of pesticide usage	Pesticide rates only available at the State level for contiguous States; noncropland uses are not included.
2002 Census of Agriculture Full Report[44]	Summary of agricultural activity, including number of farms by size and type, inventory and values for crops and livestock, and operator characteristics	Can be used to approximate land- and water-related agricultural outputs (e.g., potential pesticide burden per acre, potential exposure to cattle, dust, etc.)	Not direct measures of pesticides or probable exposures
EPA Geospatial Data Download Service[46]	Maintained by EPA and provides locations of and information on facilities throughout the United States; different datasets within this database are updated at different intervals, but most are updated monthly; no set spatial scale across datasets. Some provide addresses, some geocoded addresses, etc.	Indicators for major facilities (e.g., Superfund sites[47] Large Quantity Generators[49] Toxics Release Inventory[50] Resources Conservation and Recovery Act Treatment, Storage, and Disposal Facilities and Corrective Action Facilities[48] Assessment, Cleanup, and Redevelopment Exchange Brownfield sites[51] and Section Seven Tracking System pesticide producing site locations[52]) are available.	Contains much more information than just the facilities, type, and location; for example, Standard Industrial Classification System and Dun and Bradstreet North American Industry Classification System codes, Native American jurisdictions, interest type, etc.
National Geochemical Survey[53]	Geochemical data (arsenic, selenium, mercury, lead, zinc, magnesium, manganese, iron, etc.) for the United States based on stream sediment samples	Provides county-level means and standard deviations for each element; sampled data interpolated over nonsampled space results in variance estimates.	Includes data from several surveys; therefore, sampling locations and number of samples available vary by location.
Map of Radon Zones[54]	Identifies areas of the United States with the potential for elevated indoor radon levels; maintained by EPA	Each U.S. county is assigned to one of three radon zones based on radon potential.	Data are not actual measurements of radon, and only three levels of radon potential reduce possible county-level variability.

**Table 1. (continued) Sources of Data for Air, Water, Land, Built-Environment, and Sociodemographic Domains for Use in the Environmental Quality Index**

<b>Sociodemographic Domain</b>			
<b>Source of Data</b>	<b>Description</b>	<b>Strengths</b>	<b>Limitations</b>
U.S. Census[55]	County-level population and housing characteristics, including density, race, spatial distribution, education, socioeconomics, home and neighborhood features, and land use	Uniformly collected and constructed across the United States and can be used for construction of a variety of different variables	Decennial census available every 10 years; sample data are available at more frequent (e.g., 1-, 3-, and 5- year) intervals; may underestimate concentrations; uses simplifying assumptions when information is missing or of poor quality
Uniform Crime Reports[56]	County-level reports of violent crime	General estimate of public safety exposure	Reporting may differ across geography
<b>Built-Environment Domain</b>			
<b>Source of Data</b>	<b>Description</b>	<b>Strengths</b>	<b>Limitations</b>
Dun and Bradstreet North American Industry Classification System codes[45]	Description of physical activity environment (recreation facilities, parks, physical-fitness-related businesses) food environment (fast food restaurants, groceries, convenience stores) education environment (schools, daycares, universities) per county	Detailed, thorough data; geocoding to county level is likely accurate; ongoing updates.	Proprietary data; not publicly available
Topologically Integrated Geographic Encoding and Referencing[57]	Road type and length per county	National coverage	Different road types may not be equivalent across U.S. geography; confer different exposure risks.
Fatality Annual Reporting System[58]	Annual pedestrian-related fatality per 100,000 population; maintained by National Highway Safety Commission	County-level reports and annual updates	Pedestrian fatalities result from diverse types of events and are not well captured in the database.
Housing and Urban Development Data[60]	Housing authority profiles provide general housing details (low-rent and subsidized/ Section 8 housing); information updated by individual public housing agencies.	Complete data source for unique element of the urban built environment	Not all counties contain housing authority properties; when the value for housing authority = 0, no housing authority property is present.

## 4.0

# Variable Construction

### Approach

After data source evaluation and selection, individual variables representing the five environmental domains were developed. It was necessary to develop variables from the data sources because the raw data were not always appropriate for the chosen statistical analysis. (Note: Principal component analysis [PCA], which was used to create EQI, will be explained in more detail in the next chapter.) Many of the variables needed to be standardized, as a proportion of geographical space (e.g., road proportions) or as a rate per population (e.g., violent crimes per capita) for use in the EQI. Additionally, some data were not available for all counties but required spatial kriging to provide national coverage. Kriging is a geospatial technique that uses known data points to interpolate data at locations with unknown measurements.<sup>62</sup>

The process for variable development was as follows:

- identify and develop relevant variables within each domain for each available year (2000-2005),
- assess collinearity among the variables within each domain and eliminate redundant variables,
- assess missing data and variability of each variable; and
- assess normality of variables and transform as necessary.

Appendix II lists all the variables considered for inclusion in the EQI for each of the five domains, which variables were retained, and reasons for exclusion. The created variables are available publicly at EPA's [Environmental Dataset Gateway](#).

### *Identification and Construction of Variables from Data Sources*

For each domain, constructs of interest were identified, and variables were created from selected data sources to represent these constructs (e.g., the air domain has constructs for criteria air pollutants and HAPs). Variables were developed in a variety of manners, including kriging and standardization by area or population. Each domain section below provides the details of variable construction.

### *Assessing Variables*

The data reduction method was based on the variability between variables; therefore, collinearity of variables was assessed. This assessment was done by developing correlation matrices for each domain. Variables with any correlation coefficient  $>0.70$  were examined; representative variables were chosen for each pair or group of highly correlated variables (Appendix III).

Ideally, developed variables would have measured or estimated values for each county of the United States. When this criterion was not met, or when a majority of values were zero, the proportion of missing data and zero values were evaluated for variable inclusion. If a particular variable had information missing for many counties, the nature of the missing data was evaluated. When it was determined that the missing data could be interpreted as meaningful zeros (i.e., no measures were taken because that condition did not occur in that county), the missing values were set to zero. For instance, the counties with no reported public housing were set to zero because public housing is truly absent from some counties. When counties were missing data because reporting areas were centralized, but the data could not be assumed to be truly missing, the data were spatially kriged, when possible. For instance, crime was only reported for specific counties, even though it likely occurred in counties other than those in which it was reported as well. Therefore, crime rates were averaged spatially over adjacent counties to create an estimate for a county with no official reported crime. If the missing data could not be determined to be legitimate zeros, and the data could not be reasonably kriged or averaged over geography, and the number of counties with missing data was too high (more than 50% of counties), the variable was not used in the EQI.

In some instances, there may have been more than one data source that could represent a particular domain construct (e.g., ozone could be measured as in the AQS or modeled as in the Community Multiscale Air Quality Modeling System). In that case, the data source deemed to have better data quality and coverage was utilized.

Finally, normality of variables was evaluated. Using PCA, the chosen data reduction technique, a key assumption is that variables are distributed normally. If data were nonnormal, transformations were applied (typically log-transformation) to increase normality. For those variables with zero values, half of the nonzero minimum value was added to all observations before log-transformation.

Variable consistency (mean and standard deviation) was compared across each year of the 6-year period (2000-2005). Additionally, proto-EQIs were constructed using data from 1 year (2002) and from the average of all 6 years. When data were kriged spatially, the team compared county-level values before and after kriging. Because these county-level values were temporally consistent, the EQI was constructed based on county-level averages for the 6-year period for each variable in each domain.

## Summary of Activities

### Domain-Specific Variable Descriptions

Variables were created for each environmental domain to various constructs within that domain.

- Air domain variables were created to represent two constructs: (1) criteria air pollutants and (2) HAPs.
- Water domain had eight constructs: (1) overall water quality, (2) general water contamination, (3) recreational water quality, (4) domestic use, (5) atmospheric deposition, (6) drought, and (7) chemical contamination.
- Land domain included variables representing five constructs: (1) agriculture, (2) pesticide use, (3) soil contaminants, (4) large facilities, and (5) radon zones.
- Built-environment domain was represented by five constructs: (1) the housing environment, (2) traffic safety, (3) public transportation usage, (4) road properties, and (5) the business environments.
- Sociodemographic environment domain was represented by two constructs: (1) socioeconomic and (2) crime.

### Air Domain

The air domain consists of two data sources, (1) the AQS<sup>33</sup> and (2) the NATA,<sup>34</sup> representing criteria air pollutants and HAPs.

#### Criteria Air Pollutants

Daily concentration data from the EPA's AQS monitors (point scale) were downloaded for ozone, CO, sulfur dioxide, nitrogen dioxide, PM under 10  $\mu\text{m}$  in aerodynamic diameter ( $\text{PM}_{10}$ ), and PM under 2.5  $\mu\text{m}$  in aerodynamic diameter ( $\text{PM}_{2.5}$ ). Annual averages were calculated for each pollutant at each monitor with data. These averages were then used in a kriging procedure to estimate annual concentration at each county's center point for each year from 2000 to 2005.

For the EQI spanning 2000 to 2005, a single average concentration was calculated for each county from the kriged estimates. When indicated (i.e., log-normal distribution) half of the minimum nonzero value was added, and variables were log transformed.

#### HAPs

County-level concentrations estimates from NATA were used for all HAPs included in the EQI. HAPs were selected for inclusion from the full NATA pollutant list. Using data from 2002, variables were evaluated for collinearity and

**Table 2. Selected Hazardous Air Pollutants from the National-Scale Air Toxics Assessment (1999, 2002, and 2005) Used in the Environmental Quality Index**

All Years	2002, 2005 Only	All Years	2002, 2005 Only
1,1,2,2-tetrachloroethane	2-chloroacetophenone	Ethylene oxide	Isophorone
1,1,2-trichloroethane	2-nitropropane	Glycol ethers	Methanol
1,2-dibromo-3-chloropropane	4-nitrophenol	Hexachlorobenzene	Methyl isobutyl ketone
2,4-toluene diisocyanate	Acetophenone	Hydrazine	Methyl methacrylate
Acetonitrile	Biphenyl	Hydrochloric acid	Methylhydrazine
Acrolein	Bromoform	Lead compounds	Methyl tert-butyl ether
Acrylic acid	Carbon disulfide	Manganese compounds	Nitrobenzene
Acrylonitrile	Carbon sulfide	Mercury compounds	N,N-dimethylaniline
Antimony compounds	Chlorobenzene	Methyl chloride	Pentachlorophenol
Benzidine	Chromium compounds	o-toluidine	Phosphine
Benzyl chloride	Cresol/cresylic acid	Polycyclic aromatic hydrocarbon	Phosphorus
Beryllium compounds	Cumene		compounds/polycyclic organic matter
bis-2-ethylhexyl phthalate	Dibutylphthalate	Polychlorinated biphenyls	Selenium compounds
Cadmium compounds	Diesel engine emissions	Propylene dichloride	Styrene
Carbon tetrachloride	Dimethyl phthalates	Propylene oxide	Tetrachloroethylene
Chlorine	Dimethyl sulfate	Quinoline	Trichloroethylene
Chloroform	Epichlorohydrin	Toluene	Triethylamine
Chloroprene	Ethyl chloride	Vinyl chloride	Vinyl acetate
Cyanide compounds	Ethylene glycol		Vinylidene chloride
Dimethyl formamide	Ethylidene dichloride		
Ethyl acrylate	Hexachlorobutadiene		
Ethylene dibromide	Hexachlorocyclopentadiene		
Ethylene dichloride	Hexane		



variability. Variables with any correlation coefficient  $>0.70$  were examined, and representative variables were chosen for each pair or group of highly correlated variables. Of the remaining variables, all missing values were set to zero, with the assumption that lack of measurement for an area indicated low concern for contamination with a particular HAP, and the number of zero values was evaluated for each variable. Pollutants with more than 50% zero values were dropped. This process left 81 HAPs included in the EQI. For the EQI spanning 2000 to 2005, concentration estimates for the included pollutants were taken from NATA for 1999 (only 41 available), 2002, and 2005 and averaged across years (Table 2). Correlations between individual years and averages were very high ( $>0.9$ ). When indicated (i.e., log-normal distribution), half of the minimum nonzero value was added and variables were log transformed.

The air domain includes 87 variables representing criteria and HAPs.

### ***Water Domain***

The water domain included five data sources: (1) the WATERS program database,<sup>35</sup> (2) Estimates of Water Use in the United States,<sup>37</sup> (3) the NADP,<sup>39</sup> (4) the Drought Monitor Network,<sup>38</sup> and (5) the NCOD.<sup>36</sup> Using these five data sources, variables were created to represent seven constructs that describe the overall water environment. The seven constructs were (1) overall water quality, (2) general water contamination, (3) recreational water quality, (4) domestic use, (5) atmospheric deposition, (6) drought, and (7) chemical contamination.

### **Overall Water Quality**

Impairment and water quality standards (WQS) data were obtained for the most recent State reported data that were collected under Sections 303(d) and 305(b) of the CWA.<sup>63</sup> The CWA is administered at the State level, and data are voluntarily reported from the States to the Federal level. The dates of the reported data ranged from 2004 to 2010 as the Federal reporting system maintains only the most recent data reported by each State. Under Section 305(b) of the CWA, States establish WQS for each hydrological feature based on the expected use (or uses) of these waters. Under Section 303(d) of the CWA, States assess whether waters are impaired (do not meet the standards) for the uses established in the WQS. This assessment is conducted biennially, and the States voluntarily report these data to the Federal level.

County-level impaired stream length was estimated for the contiguous United States using impairment and WQS data (from the WATERS database). With the designated uses listed for each State, the WQS was classified into five broad categories of water use: (1) agriculture, (2) drinking water, (3) recreation, (4) wildlife, and (5) industry. Using geographic information systems (GIS), county-level percentages of impairment were calculated. WQS and impairment datasets were joined to the map layer of hydrologic features in EPA's RAD.<sup>64</sup> RAD is a replicate of the National Hydrography Dataset Plus<sup>65</sup> augmented for reporting water quality data. The defined broad water use categories were joined to the WQS data, and a table

summarizing hydrologic features with multiple uses was created. WQS and impairment tables were assigned to features in the RAD using GIS Network and Event tools. These tools link tabular database information with linear or polygon features. Stream lengths were clipped by county boundaries to calculate percent impairment by county. Only linear water features were included in each category. Polygon features, such as lakes, were excluded because of the lack of well-defined county and State boundaries across water bodies. Next, county and State designations were linked with linear features in RAD. Once all data were associated to linear hydrologic features, lengths were calculated for water features impaired for any use, drinking water use, or recreational use and for all stream lengths within a county. Of the 11 variables developed, only 1, the cumulative measure of percent of water impaired for any use, was used; the others were not used because of missing data (Appendix II).

### **General Water Contamination**

Water contamination can be caused by several sources. Unfortunately, EPA only has consistent data on the point sources of contamination in the form of the number of National Pollutant Discharge Elimination System (NPDES)<sup>66</sup> permits. Therefore, the number of permits in a county was used as a proxy for general water contamination. Using permit information in the WATERS database, 13 variables were calculated for the number of discharge permits in a county. Permits that were current during the period 2000-2005 were selected. The 10 variables that were calculated based on individual permit types had too many missing data; therefore, three composite variables were created for inclusion in the EQI. A composite variable was developed for the number of sewage permits per 1000 km of stream length in a county. The number of animal feeding operations and concentrated animal feeding operations NPDES permits, combined sewer overflow NPDES permits, and NPDES permits for sludge in each county were summed and divided by the total stream length in the county. Similarly, composite variables were calculated for industrial permits (combining the total of pretreatment NPDES permits, general facilities NPDES permits, and individual facilities NPDES permits) and stormwater permits (combining the total of general stormwater NPDES permits, industrial stormwater NPDES permits) by county per 1000 km of stream length. These three variables were not collinear.

### **Recreational Water Quality**

The WATERS database includes annual information on the number of days of beach closures. Three variables were created for (1) the total number of days of beach closure for any event in a county, (2) the total number of days of beach closure for contamination events in a county, and (3) the total number of days of beach closure for rain events in a county for the entire period 2000-2005. The three variables constructed from these data were not collinear.

### **Domestic Use**

Data from the Estimates of Water Use in the United States database were used as a proxy for domestic water quality. If water is being withdrawn for competing uses (agriculture,

industry, etc.), it will put stress on water supplies, which, in turn, will affect water quality. This database includes county-level estimates of water withdrawals for domestic, agricultural, and industrial use. Initially, 15 variables of water withdrawals for domestic, agricultural, and industrial use were developed. These data are estimated every 5 years and were included in the EQI as averaged data for 2000 and 2005. Two variables were included in the EQI after evaluation for collinearity (four variables removed) and missing data (nine variables removed). The two variables were (1) the percent of population on self-supplied water supplies and (2) the percent of those on public water supplies that are on surface waters. For these variables, higher values are not necessarily a marker for poor water quality. The data were provided at the county level and normally distributed; therefore, no additional transformation was required.

### **Atmospheric Deposition**

The atmospheric deposition of chemicals can affect water quality. The NADP dataset provides measures for the concentration of nine chemicals in precipitation: (1) calcium, (2) magnesium, (3) potassium, (4) sodium, (5) ammonium, (6) nitrate, (7) chloride, (8) sulfate, and (9) mercury. Annual summary data from each monitoring site for each year 2000-2005 were kriged spatially to achieve national coverage and county-level estimates. The annual estimates for each pollutant then were averaged over the 6-year study period. The data for all pollutants, except sulfate, were skewed and, therefore, were natural log transformed to achieve normal distributions. No variables were removed for collinearity or missing data.

### **Drought**

Drought affects the concentration of pathogens and chemicals in water bodies and, therefore, can affect water quality. The Drought Monitor dataset provides raster data on six possible drought status conditions for the entire United States on a weekly basis. The data were aggregated spatially to the county level to estimate the percentage of the county in each drought status condition. The weekly data were averaged to achieve annual estimates for 2000-2005 and, then, averaged to create a composite for the entire period. From this data, the percentage of the county in extreme or exceptional drought (intensity levels D3 and D4, respectively) was used in the EQI. The remaining five drought status conditions were removed, as all of the drought statuses were highly correlated.

### **Chemical Contamination**

Chemical contamination of water supplies can directly affect human health. The NCOD dataset provides data on 69 contaminants provided by public water supplies throughout the country for the period from 1998-2005. Data for all samples in a county for each contaminant were averaged over the entire period of the dataset, 1998-2005. The data were also natural log transformed to achieve normal distributions. Missing values were set to zero, with the assumption that lack of measurement for an area indicated low concern

for contamination with that particular contaminant. Eight contaminants, (1) asbestos, (2) diquat, (3) endothall, (4) glyphosate, (5) dioxin, (6) radium, (7) beta particles, and (8) uranium, did not include data for enough counties (missing data) to be included in the EQI construction. No variables were deleted for collinearity.

### **Land Domain**

The land domain consisted of eleven data sources, representing five constructs: (1) agriculture, (2) pesticide use, (3) soil contaminants, (4) facilities, and (5) radon zone.

### **Agriculture**

Information on nonpesticide chemicals used in farming, animal units, harvested acreage, irrigated acreage, and proportion of farms was taken from the 2002 Census of Agriculture.<sup>44</sup> Final acreage for each item then was divided by total acreage for each county to return a percentage (e.g., percentage of irrigated acres out of total acres in a county). In some cases, county-level acreage for items was suppressed. In these, case estimates were imputed based on unaccounted for and total State-level acreage. Known acreage was subtracted from total State acreage, leaving an “unassigned” total acreage for each State. This total number was divided by the total number of farms in counties with suppressed acreage to return an average acreage for each farm. This average acreage then was multiplied by the number of farms in each county with suppressed acreage to estimate acreage. Animal units were estimated by multiplying the number of livestock (cows, hogs, and poultry) by the animals per animal unit statistic<sup>67</sup> and then adding together all livestock categories for each county. Seven variables representing agriculture were included in the EQI.

### **Pesticide Use**

Pesticide use for each county was estimated using crop data from the 2002 Census of Agriculture and State-pesticide-use data from the 2002 National Pesticide Use Dataset.<sup>43</sup> Where available, county-level acreage for oats, potatoes, soybeans, and wheat crops was used for estimation of pesticide use. When county-level data were not available, it was imputed based on unaccounted for and total State-level acreage, as was described in the agriculture construct above. These crops were used as they had the most complete spatial coverage in the United States, and pesticide use information was available for them. County-level acreage was multiplied by State-level pesticide use rates (tons per acre) to estimate tons of herbicides, fungicides, and insecticides applied in each county. These three pesticide categories were included in the EQI. Pesticide variables were evaluated for normality and log transformed.

### **Soil Contaminants**

Extracted from the NGS,<sup>53</sup> soil contaminant concentrations were collected from States and combined over multiple years (ranging variably from 1998-2007). These data, collected for stream sediments, soils, and other media, were combined at the county level to estimate the mean values of 13 geochemical contaminants. Contaminant variables were evaluated for normality and log transformed.



## Facilities

Large facilities have the capacity to affect land quality. The facilities included in the land domain are those represented on the EPA Geospatial Data Download Service<sup>46</sup>. Because many counties had at least one, but no counties had all six of the facility types present, a composite facilities data variable was constructed by summing the count of any one of the six facilities types (Brownfield sites (n=1226),<sup>51</sup> Superfund sites (n=721),<sup>47</sup> Toxic Release Inventory sites (n=2670),<sup>50</sup> pesticide-producing-location sites (n=2095),<sup>52</sup> large-quantity generator sites (n=1926),<sup>49</sup> and treatment, storage, and disposal sites (n=874)<sup>48</sup>) across the counties. Facilities were included in the count if they were identified during the 2000-2005 period. The count of facilities was divided by the county population, which produced a facilities rate. The facilities rate variable was assessed for normality and log transformed.

## Radon Zone

The potential for elevated indoor radon levels was represented using the county score from the EPA Radon Zone map,<sup>54</sup> which was available for 3126 counties. The EPA Radon Zone map identified areas of the United States with the potential for elevated indoor radon levels. Each U.S. county was assigned to one of three zones based on radon-level elevation potential.

## Sociodemographic Domain

This domain was constructed to explore the sociodemographic features of counties in the United States. These features were used to approximate the social-stress associated with residing in more deprived (low education, high unemployment, high violent crime, high poverty, etc.) or more affluent (high professional occupations, low property crime, high proportion of college graduates, etc.) counties. This domain includes variables from the 2000 U.S. Census<sup>55</sup> and the FBI UCRs.<sup>56</sup> Because the sociodemographic domain is related to population density, by virtue of the data collection and reporting, variables were developed as population rates (denominator: count of persons per county), rather than area-based rates (denominator: square miles per county).

Eleven variables were obtained from the 2000 U.S. Census. The 11 variables were (1) percent renter-occupied housing, (2) percent vacant housing units, (3) median household value, (4) median household income, (5) percent persons living below the Federal poverty line, (6) percent no English-speaking, (7) percent earning more than a high school education, (8) percent unemployed, (9) percent working outside the county of residence, (10) median number of rooms in the housing unit, and (11) percent of housing with more than 10 units. The sociodemographic domain contains a mix of positive and negative features; therefore, when the sociodemographic domain was constructed, positive variables were reverse-coded to ensure that a higher amount of the sociodemographic domain will represent adverse environmental conditions.

The area-level crime environment was represented using the FBI UCRs.<sup>56</sup> The first step in constructing crime data was to assign each jurisdiction or place to a county using county Federal Information Processing Standards<sup>68</sup> code. In cases when a jurisdiction covered more than one county, the reported crime was assigned to both counties. Although this double assignment results in a slight inflation of crime reports for a State, there was no way to determine which county should receive the crime report. Further, if police or municipal jurisdictions crossed county lines, it is likely residents of both counties were “exposed” to the crime environment. Crime data attributed to more than one county occurred in approximately 15 counties. Second, because crime was reported for less than half the U.S. counties, crime data were kriged spatially and temporally to estimate values for counties with no reported crime. The decision was made to krig these data because data reporting was voluntary, and it seemed unlikely that no crime occurred in the nonreported areas. Because zeros could not be reasonably assigned to the missing counties, the data were interpolated spatially and temporally instead. The kriged values for violent and property crime (two variables), constructed for all counties, were considered for inclusion in the sociodemographic domain of the EQI. The correlation between the property and violent crime rates was very high (0.96); therefore, only log violent crime was included in the EQI.

## Built-Environment Domain

Five data sources were included in the built domain, representing (1) the housing environment, (2) traffic safety, (3) public transportation usage (commuting behaviors), (4) road properties (road type and density), and (5) the business and service environments (e.g., food, recreation).

### Housing Environment

The subsidized housing environment was represented by the Housing and Urban Development data.<sup>60</sup> These data provide a count of the low-rent and Section 8 housing in each housing authority data area. The housing authority areas correspond to cities, which were assigned county codes. Data were collected in 2010, but, because low-rent and Section 8 housing does not change substantially over time, these data were considered representative of the 2000-2005 period. The variables were summed to result in the count of any low-rent or Section 8 housing in each county. The rate of subsidized housing was constructed by dividing the count of subsidized housing units per county by the county population. The data were log transformed prior to inclusion in the EQI.

### Traffic Safety

Traffic fatalities, an important feature and consequence of the built environment, were estimated using the FARS data. The FARS is a national census providing the National Highway Traffic Safety administration yearly reports of fatal injuries suffered in motor vehicle crashes. Rates for the 2000-2005 counts of fatal crashes per county were constructed by dividing the count of county-level fatal crashes by the county-level population. Many counties had no fatal crashes.

To accommodate the large number of meaningful zeros in the data, the log of this rate variable was used in the built domain of the EQI.

### **Public Transportation Usage**

The percent of county residents who use public transportation was estimated using the 2000 U.S. Census<sup>55</sup> variable in the EQI. For many counties, the percent of the population who reports using public transportation is near zero. Therefore, this variable was log transformed prior to its use in the built domain of the EQI.

### **Road Properties**

For the built-environment domain, characterizing the relative proportions of each county that was served by highways, secondary roads, and primary roads were of interest, as these types of roads confer different risks (related to speed and safety) and benefits (related to neighborhood walking or ease of transit). Road type for the year 2003 was approximated using TIGER data,<sup>57</sup> which are available at multiple units of geography. Three proportion variables were constructed by dividing the mileage of each road type (e.g., secondary roads) by the total road mileage in each county. The proportions of all roadways that were highways or primary roads were included.

### **Business and Service Environments**

Businesses represent an important component of the built environment and can contribute to the risk and amenity landscape. Variables representing various built-environmental features were constructed using 2002 Dun and Bradstreet data,<sup>45</sup> which include commercial information on businesses, data on more than 195 million records, and are proprietary. Nine rate variables were constructed by dividing the county-level count of a business type by the county-level population count. The nine variables that were constructed included the (1) positive food environment, (2) negative food environment, (3) vice environment (alcohol, pawn, and gaming), (4) entertainment environment, (5) health care business environment, (6) recreation environment, (7) education environment, (8) social-service environment, and (9) transportation-related environment. Note: Positive food environments included those that sold healthier foods, like grocery stores, sit-down restaurants, and organic shops, whereas the negative food environment included businesses like fast-food restaurants, convenience stores, and pretzel trucks. Although related, these two food environments comprise different businesses and are not 100% inversely correlated. Nonnormally distributed variables were log transformed and all nine were included in the EQI.

## 5.0

# Data Reduction and Index Construction

### Overall Approach

After variable development, all the variables were combined into an index representing the overall environmental quality. The specific tasks required for index construction were as follows:

- included all the variables from one domain in a PCA to empirically summarize that domain-specific environmental context (retaining the first component as the domain index);
- did this for each of the five domains;
- combined each of the five domain-specific indices in another PCA to empirically summarize the overall environmental context into one index of environmental quality and retained the initial component as the overall EQI; and
- repeated the three previous steps for each of the four RUCC strata (e.g., RUCC stratum 1 air domain; RUCC stratum 2 air domain, etc.), such that each RUCC had its own set of domain-specific indices, as well as its own overall index.

The EQI, domain-specific indices, and EQI stratified by rural-urban data are available publicly at EPA's Environmental Dataset Gateway. Also, an interactive map of the EQI is available at EPA's GeoPlatform.

### PCA

PCA is a data reduction technique frequently used to create sociodemographic scales or indices for inclusion in statistical models.<sup>69</sup> PCA analyzes total variance and the loading represents the correlation between the variable and the component. PCA assumes no underlying latent variable structure but, rather, seeks to empirically summarize multiple possible domains. Three major goals of PCA are to

1. summarize the patterns of correlations among observed or measured variables,
2. provide an operational definition—in this case, a regression equation—for underlying processes by using observed or measured variables, and
3. reduce a large number of observed variables into a smaller number of factors or a single component.

PCA was chosen for data reduction for several reasons. Production of an empirical summary of the various constituent components of the EQI was desired. Various data sources measured on multiple scales needed to be combined. PCA standardized these measures prior to combining.

Therefore, the differing scales were less problematic. To assess variables influences on the index, variables cannot simply be added together. To do so would mean knowledge for most of the variables would not be available to indicate if any one variable would prove to be more “influential” for environmental quality than another. PCA enabled variable loadings to vary by their relative importance to the total component. This feature enabled exploration of variable loading differences for interpretation purposes.

The PCA steps included

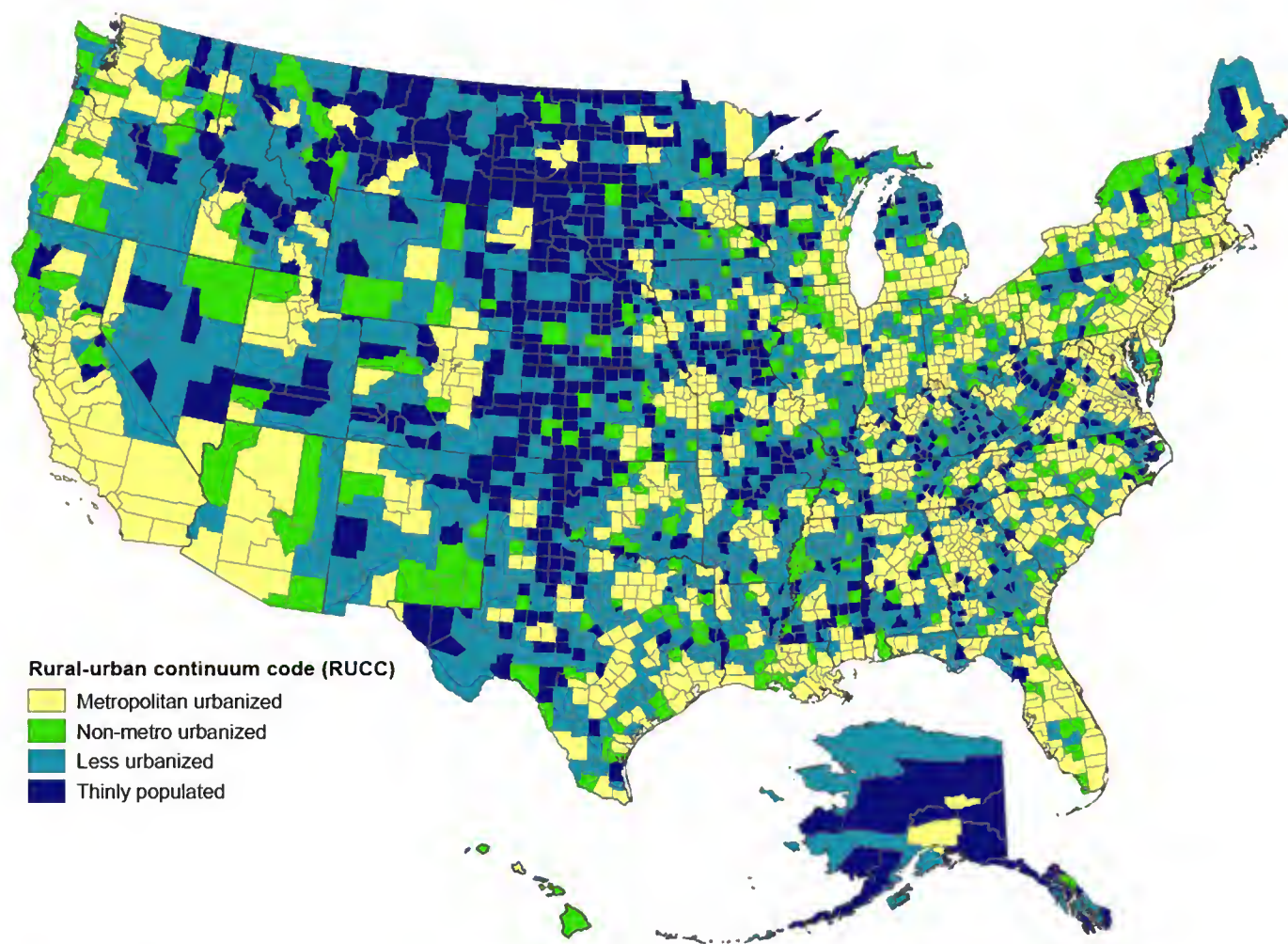
- selecting the set of variables to be used,
- preparing the correlation matrices,
- extracting the set of components from the correlation matrix,
- determining the number of components observed, and
- interpreting the findings.

PCA analyzes the total variance. Therefore, in the PCA correlation matrix, “1” is in the positive diagonal. To construct the EQI, variables from each domain were entered into domain-specific PCAs. PCA produced variable loadings, which were roughly equivalent to the “weight” or contribution that each variable made toward explaining the total variance. The weights, however, need not sum to 1.0 because the loadings were for the total variance, not just the shared variance. The loading associated with each variable then was multiplied by its mean value for the given geography (county, for the EQI), and these weighted mean values were summed.

### Rural-Urban Continuum

Both the domain-specific indices and the overall EQI were created for each county in the United States. Recognizing that environments differ dramatically across the rural-urban continuum,<sup>70</sup> the decision was made that the EQI would be most useful if it accommodated rural-urban environmental differences. The EQI was stratified by RUCCs. The RUCC is a nine-item categorization code of proximity to or influence of major metropolitan areas.<sup>71</sup> The nine-item categories were condensed into four, where RUCC1 represents metropolitan-urbanized = codes 1+2+3; RUCC2 nonmetropolitan-urbanized = 4+5; RUCC3 less urbanized = 6+7; and RUCC4 thinly populated (rural) = 8+9 (see Figure 2).<sup>72-75</sup> RUCC-stratified EQIs and an overall EQI were constructed. Loadings on the stratified and nonstratified sets of indices were assessed to determine loading heterogeneity across counties. Because these loadings differed meaningfully by RUCC level, RUCC-stratified EQIs were constructed for each county.





**Figure 2. Rural-urban continuum code (RUCC) stratification for all counties in the United States.**

Although it was possible to form as many independent linear combinations as there were variables in PCA, only the first principal component was retained. The first principal component was the unique linear combination that accounted for the largest possible proportion of the total variability in the component measures. Therefore, the first component from each of these domain-specific indices was retained (e.g., air index, water index). Domain-specific indices were then entered into another PCA, where the first component was retained as the EQI (Figure 3). This process was undertaken separately for each of the four RUCC strata.

Within each RUCC strata, domain-specific variable loadings were evaluated based on the value of variable loading and the variable's hypothesized relevance to health. For instance, although arsenic may occur in low frequency in a lot of counties and, therefore, may have a relatively small component loading, it is an important health hazard when present. Based on variable loading magnitude alone, dropping arsenic from an EQI may be a reasonable conclusion. However, it was retained for the EQI based on its relevance to human health.

The first principal component, titled the domain-specific EQI (e.g., air domain EQI), was then standardized to have a mean of 0 and standard deviation (SD) of 1 by dividing the index by the square of its eigenvalue.<sup>76</sup> Each domain-specific index was then included in a second PCA procedure (Figure 3) to result in the overall EQI for each strata of RUCC.

## Results

### Description of Variables Comprising EQI Domains

#### *Air Domain*

Variables included in the air domain generally showed moderate-to-high variability between rural and urban strata, with higher averages in the most urban stratum decreasing to the most rural stratum (Table 3). For example, CO had mean values of 705, 598, 472, and 343 ppm for each stratum from most urban to most rural. This pattern held true for most of the HAPs as well, although some pollutants showed higher means in the nonmetropolitan-urbanized or less urbanized strata (e.g., chlorine, dimethyl sulfate). Others, like carbon tetrachloride, are similar across rural-urban strata.

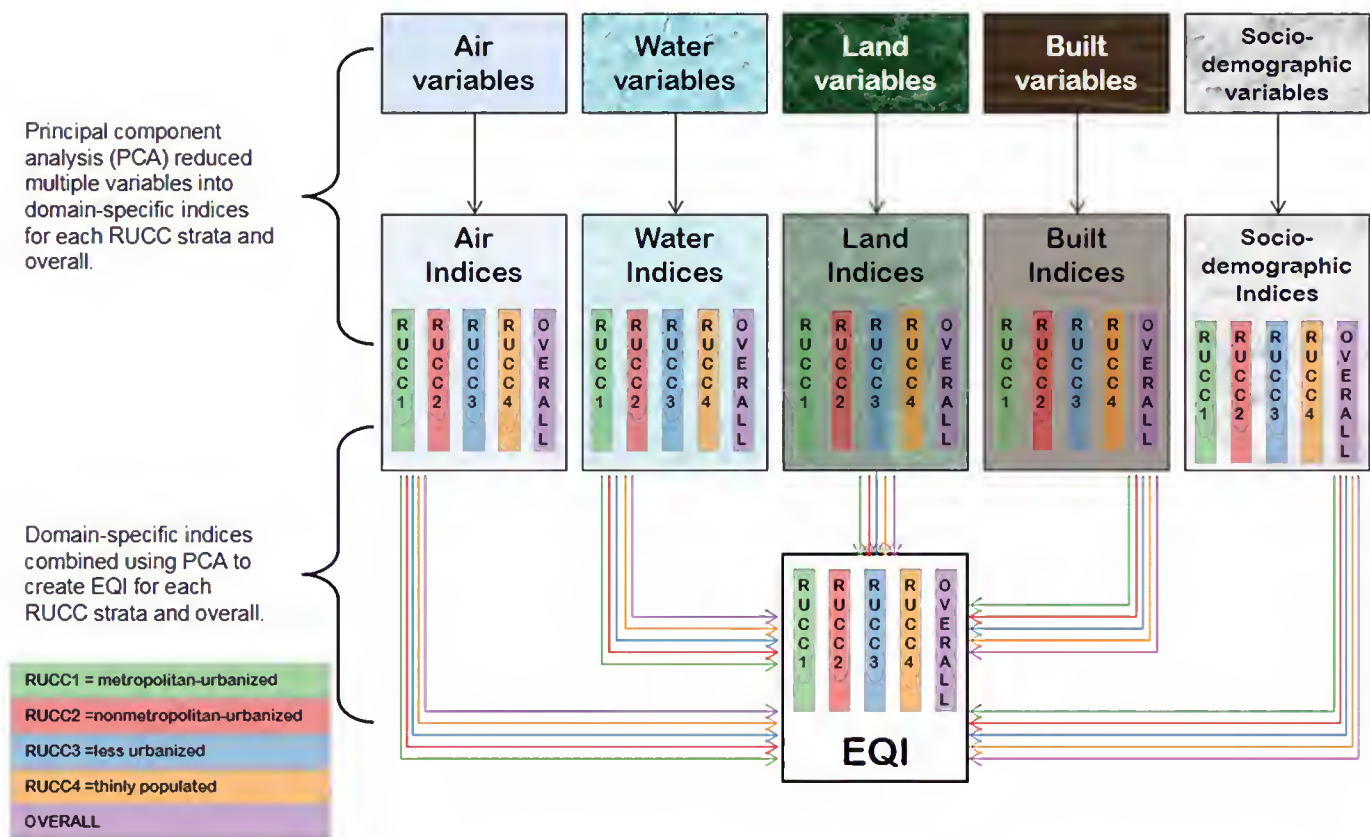


Figure 3. Principal component analysis concept for Environmental Quality Index. Performed for all counties and each of the four strata of the rural-urban continuum (RUCC) codes.\*

Table 3. Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified

		Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
Variable	Units	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Air Domain						
Construct: Criteria Air Pollutants						
Nitrogen dioxide	ppb	7.95E+02 (7.05E+02)	4.97E+02 (4.13E+02)	4.21E+02 (3.95E+02)	3.53E+02 (3.36E+02)	5.44E+02 (5.49E+02)
		[1.01E+00, 8.65E+03]	[1.29E+00, 2.59E+03]	[1.00E+00, 8.66E+03]	[1.00E+00, 3.42E+03]	[1.00E+00, 8.66E+03]
Carbon monoxide	ppm	7.05E+02 (1.06E+03)	5.98E+02 (5.55E+02)	4.72E+02 (4.95E+02)	3.43E+02 (4.55E+02)	5.38E+02 (7.52E+02)
		[1.26E+00, 2.48E+04]	[1.11E+00, 3.25E+03]	[1.00E+00, 4.61E+03]	[1.05E+00, 4.45E+03]	[1.00E+00, 2.48E+04]
Sulfur dioxide	ppb	2.95E+02 (5.56E+02)	2.09E+02 (2.99E+02)	1.63E+02 (2.09E+02)	1.39E+02 (2.01E+02)	2.08E+02 (3.79E+02)
		[1.00E+00, 1.22E+04]	[1.00E+00, 3.71E+03]	[1.00E+00, 2.32E+03]	[1.00E+00, 1.73E+03]	[1.00E+00, 1.22E+04]

\* For orientation to the results, low index scores (EQI and domain-specific) indicate higher environmental quality, and higher index scores (EQI and domain-specific) mean lower environmental quality.

**Table 3.(continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

Variable	Units	Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
		Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Ozone	ppm	6.02E+03 (5.07E+03) [1.72E+00, 8.03E+04]	5.06E+03 (4.06E+03) [7.80E+00, 4.20E+04]	4.30E+03 (3.50E+03) [1.24E+00, 5.81E+04]	3.75E+03 (2.54E+03) [1.33E+00, 2.05E+04]	4.86E+03 (4.11E+03) [1.24E+00, 8.03E+04]
PM <sub>10</sub>	µg/m <sup>3</sup>	14.199 (5.193) [1.777, 39.554]	11.258 (4.533) [2.370, 27.095]	9.852 (3.924) [1.000, 34.625]	8.446 (3.596) [1.011, 21.404]	11.204 (4.974) [1.000, 39.554]
PM <sub>2.5</sub>	µg/m <sup>3</sup>	10.621 (2.205) [3.443, 16.912]	9.586 (2.351) [2.162, 14.397]	9.379 (2.466) [1.029, 14.451]	8.265 (2.745) [1.138, 13.437]	9.593 (2.582) [1.029, 16.912]
Construct: Hazardous Air Pollutants						
1,1,2,2-Tetrachloroethane	Tons emitted	0.014 (0.008) [0.002, 0.048]	0.012 (0.003) [0.003, 0.019]	0.005 (0.003) [0.002, 0.016]	2.02E-03 (5.76E-04) [1.37E-03, 6.83E-03]	0.008 (0.007) [0.001, 0.048]
1,1,2-Trichloroethane	Tons emitted	0.001 (0.014) [0, 0.426]	5.16E-04 (4.01E-03) [0, 4.38E-02]	2.72E-04 (4.47E-03) [0, 1.33E-01]	6.82E-05 (1.04E-03) [0, 2.43E-02]	4.86E-04 (8.75E-03) [0, 4.26E-01]
1,2-Dibromo-3-chloropropane	Tons emitted	3.91E-06 (1.17E-05) [7.80E-07, 2.74E-04]	3.04E-06 (5.61E-06) [8.27E-07, 5.46E-05]	2.81E-06 (4.37E-06) [7.22E-07, 3.63E-05]	1.90E-06 (2.80E-06) [7.22E-07, 2.50E-05]	3.02E-06 (7.70E-06) [7.22E-07, 2.74E-04]
2,4-Toluene diisocyanate	Tons emitted	1.05E-03 (1.61E-03) [4.05E-07, 1.32E-02]	7.57E-04 (2.05E-03) [2.66E-06, 3.02E-02]	3.44E-04 (1.25E-03) [9.78E-09, 2.00E-02]	5.69E-05 (2.06E-04) [1.74E-09, 4.52E-03]	5.68E-04 (1.42E-03) [1.74E-09, 3.02E-02]
2-Chloroacetophenone	Tons emitted	7.58E-07 (1.63E-05) [0, 5.38E-04]	9.70E-08 (1.90E-07) [0, 1.26E-06]	1.08E-07 (6.82E-07) [0, 1.75E-05]	6.30E-08 (3.56E-07) [0, 7.32E-06]	3.23E-07 (9.63E-06) [0, 5.38E-04]
2-Nitropropane	Tons emitted	3.82E-05 (4.64E-04) [0, 9.10E-03]	7.48E-06 (5.99E-05) [0, 8.76E-04]	5.15E-06 (1.04E-04) [0, 3.26E-03]	6.99E-07 (1.09E-05) [0, 2.21E-04]	1.59E-05 (2.81E-04) [0, 9.10E-03]
4-Nitrophenol	Tons emitted	4.32E-05 (6.16E-05) [2.62E-07, 6.44E-04]	2.25E-05 (1.46E-05) [2.26E-06, 1.29E-04]	7.80E-06 (7.66E-06) [0, 9.69E-05]	1.65E-06 (2.20E-06) [0, 1.73E-05]	2.03E-05 (4.09E-05) [0, 6.44E-04]
Acetonitrile	Tons emitted	0.001 (0.008) [0, 0.150]	5.75E-04 (2.18E-03) [0, 2.46E-02]	5.34E-04 (2.58E-03) [0, 4.57E-02]	3.75E-04 (2.23E-03) [0, 3.65E-02]	7.75E-04 (4.90E-03) [0, 1.50E-01]
Acetophenone	Tons emitted	1.98E-04 (8.85E-04) [1.74E-07, 1.69E-02]	1.71E-04 (7.63E-04) [1.59E-06, 1.09E-02]	1.40E-04 (1.84E-03) [0, 4.42E-02]	2.41E-05 (1.92E-04) [0, 2.94E-03]	1.39E-04 (1.22E-03) [0, 4.42E-02]
Acrolein	Tons emitted	0.045 (0.039) [0.002, 0.372]	0.025 (0.022) [0.003, 0.165]	0.018 (0.023) [0.001, 0.245]	0.012 (0.038) [0.001, 0.920]	0.027 (0.036) [0.001, 0.920]
Acrylic acid	Tons emitted	2.17E-04 (1.25E-03) [9.57E-12, 2.70E-02]	8.63E-05 (5.61E-04) [2.38E-11, 6.81E-03]	1.09E-04 (1.51E-03) [8.45E-13, 3.20E-02]	1.30E-05 (7.92E-05) [1.43E-13, 1.02E-03]	1.23E-04 (1.16E-03) [1.43E-13, 3.20E-02]
Acrylonitrile	Tons emitted	4.33E-03 (6.72E-03) [3.87E-04, 1.66E-01]	3.06E-03 (3.49E-03) [3.83E-04, 3.84E-02]	2.47E-03 (2.60E-03) [3.67E-04, 2.00E-02]	1.75E-03 (2.19E-03) [3.67E-04, 1.76E-02]	3.02E-03 (4.60E-03) [3.67E-04, 1.66E-01]



**Table 3.(continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

Variable	Units	Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
		Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Antimony compounds	Tons emitted	1.60E-04 (1.36E-03) [1.31E-10, 3.96E-02]	1.92E-04 (2.19E-03) [2.16E-10, 3.91E-02]	3.98E-05 (2.78E-04) [0, 5.86E-03]	1.10E-05 (9.61E-05) [0, 1.72E-03]	9.09E-05 (1.08E-03) [0, 3.96E-02]
Benzidine	Tons emitted	3.69E-07 (3.63E-06) [5.94E-09, 1.07E-04]	2.43E-07 (1.23E-06) [6.30E-09, 2.12E-05]	2.39E-07 (6.65E-07) [5.50E-09, 1.20E-05]	1.61E-07 (3.95E-07) [5.50E-09, 5.31E-06]	2.68E-07 (2.21E-06) [5.50E-09, 1.07E-04]
Benzyl chloride	Tons emitted	4.32E-05 (2.78E-04) [2.51E-09, 7.58E-03]	1.08E-05 (2.62E-05) [0, 2.20E-04]	7.76E-06 (2.37E-05) [0, 3.54E-04]	3.87E-06 (1.24E-05) [0, 1.43E-04]	1.95E-05 (1.65E-04) [0, 7.58E-03]
Beryllium compounds	Tons emitted	4.44E-05 (1.54E-04) [1.01E-05, 3.60E-03]	2.79E-05 (2.90E-05) [1.02E-05, 3.73E-04]	2.89E-05 (1.87E-04) [9.40E-06, 5.93E-03]	1.63E-05 (2.28E-05) [9.27E-06, 4.52E-04]	3.15E-05 (1.42E-04) [9.27E-06, 5.93E-03]
Biphenyl	Tons emitted	4.87E-04 (2.69E-03) [3.43E-07, 5.87E-02]	3.02E-04 (1.04E-03) [1.34E-06, 1.15E-02]	1.70E-04 (1.53E-03) [3.53E-08, 3.79E-02]	4.51E-05 (5.16E-04) [2.94E-08, 1.30E-02]	2.67E-04 (1.87E-03) [2.94E-08, 5.87E-02]
bis-2-Ethylhexyl phthalate	Tons emitted	5.37E-01 (1.57E-03) [5.36E-01, 5.68E-01]	0.537 (0.001) [0.537, 0.550]	0.537 (0.001) [0.536, 0.555]	5.37E-01 (2.48E-04) [5.36E-01, 5.39E-01]	0.537 (0.001) [0.536, 0.568]
Bromoform	Tons emitted	2.01E-06 (8.74E-06) [0, 1.48E-04]	6.48E-07 (1.86E-06) [0, 2.69E-05]	3.12E-06 (8.24E-05) [0, 2.68E-03]	3.78E-07 (2.80E-06) [0, 6.99E-05]	1.90E-06 (4.81E-05) [0, 2.68E-03]
Cadmium compounds	Tons emitted	1.10E-04 (1.96E-04) [2.48E-05, 3.30E-03]	8.19E-05 (2.21E-04) [2.44E-05, 3.20E-03]	5.91E-05 (2.71E-04) [2.34E-05, 8.26E-03]	3.31E-05 (2.87E-05) [2.08E-05, 6.31E-04]	7.37E-05 (2.10E-04) [2.08E-05, 8.26E-03]
Carbon disulfide	Tons emitted	9.05E-03 (1.05E-01) [5.50E-07, 2.30E+00]	5.94E-03 (6.12E-02) [1.91E-06, 1.02E+00]	2.07E-03 (2.48E-02) [1.34E-07, 5.66E-01]	7.92E-04 (1.13E-02) [5.88E-09, 2.62E-01]	4.61E-03 (6.66E-02) [5.88E-09, 2.30E+00]
Carbon tetrachloride	Tons emitted	0.497 (0.006) [0.429, 0.558]	0.497 (0.003) [0.468, 0.511]	0.497 (0.005) [0.429, 0.568]	0.496 (0.008) [0.395, 0.509]	0.497 (0.006) [0.395, 0.568]
Carbon sulfide	Tons emitted	2.29E-03 (1.22E-02) [1.05E-07, 2.50E-01]	5.12E-03 (7.86E-02) [1.02E-11, 1.41E+00]	0.002 (0.019) [0, 0.410]	5.07E-04 (4.68E-03) [0, 8.43E-02]	0.002 (0.028) [0, 1.411]
Chlorine	Tons emitted	1.39E-02 (2.40E-01) [6.44E-11, 7.90E+00]	0.004 (0.011) [0, 0.089]	0.003 (0.024) [0, 0.594]	5.85E-04 (3.97E-03) [0, 9.25E-02]	0.006 (0.142) [0, 7.901]
Chlorobenzene	Tons emitted	6.80E-03 (1.81E-02) [2.78E-07, 2.25E-01]	3.18E-03 (4.98E-03) [1.37E-06, 2.47E-02]	1.12E-03 (2.24E-03) [2.26E-08, 1.18E-02]	2.43E-04 (6.13E-04) [2.88E-09, 5.47E-03]	3.11E-03 (1.12E-02) [2.88E-09, 2.25E-01]
Chloroform	Tons emitted	0.074 (0.037) [0.048, 0.616]	0.062 (0.012) [0.050, 0.158]	0.055 (0.017) [0.043, 0.420]	0.050 (0.005) [0.039, 0.140]	0.062 (0.026) [0.039, 0.616]
Chloroprene	Tons emitted	0.001 (0.017) [0, 0.434]	2.05E-05 (2.80E-04) [0, 5.03E-03]	4.01E-05 (1.03E-03) [0, 3.30E-02]	2.28E-05 (5.58E-04) [0, 1.44E-02]	4.18E-04 (1.00E-02) [0, 4.34E-01]
Chromium compounds	Tons emitted	6.72E-04 (1.00E-03) [4.15E-05, 1.66E-02]	3.49E-04 (9.03E-04) [4.24E-05, 1.03E-02]	2.50E-04 (1.91E-03) [4.08E-05, 5.88E-02]	7.97E-05 (1.61E-04) [3.42E-05, 2.40E-03]	3.70E-04 (1.31E-03) [3.42E-05, 5.88E-02]

**Table 3.(continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

Variable	Units	Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
		Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Cresol/cresylic acid	Tons emitted	5.84E-03 (1.30E-02) [8.63E-05, 1.06E-01]	3.17E-03 (1.02E-02) [7.49E-05, 8.76E-02]	1.43E-03 (4.29E-03) [1.01E-05, 5.27E-02]	7.67E-04 (3.15E-03) [8.92E-06, 4.52E-02]	3.00E-03 (9.06E-03) [8.92E-06, 1.06E-01]
Cumene	Tons emitted	1.94E-03 (9.17E-03) [1.26E-05, 2.65E-01]	9.86E-04 (2.31E-03) [7.40E-05, 2.54E-02]	3.99E-04 (1.21E-03) [1.34E-06, 2.98E-02]	1.34E-04 (4.90E-04) [1.79E-07, 9.55E-03]	9.37E-04 (5.55E-03) [1.79E-07, 2.65E-01]
Cyanide compounds	Tons emitted	3.88E-02 (5.55E-02) [4.91E-04, 1.35E+00]	0.028 (0.037) [0.003, 0.635]	1.29E-02 (3.04E-02) [1.15E-04, 9.50E-01]	4.05E-03 (5.00E-03) [3.08E-05, 6.45E-02]	2.16E-02 (4.16E-02) [3.08E-05, 1.35E+00]
Dibutylphthalate	Tons emitted	6.75E-03 (6.17E-02) [3.91E-07, 1.71E+00]	3.42E-03 (1.34E-02) [2.26E-06, 1.35E-01]	6.87E-04 (4.64E-03) [2.87E-08, 1.18E-01]	7.58E-05 (6.61E-04) [2.61E-09, 1.23E-02]	2.94E-03 (3.68E-02) [2.61E-09, 1.71E+00]
Diesel engine emissions	Tons emitted	0.607 (0.516) [0.034, 8.815]	0.352 (0.188) [0.035, 1.791]	0.235 (0.129) [0.001, 0.991]	1.53E-01 (9.87E-02) [1.59E-04, 5.42E-01]	3.59E-01 (3.73E-01) [1.59E-04, 8.82E+00]
Dimethyl formamide	Tons emitted	1.89E-03 (4.79E-03) [3.69E-06, 1.09E-01]	1.51E-03 (8.82E-03) [3.86E-05, 1.59E-01]	6.16E-04 (7.65E-03) [2.56E-06, 2.46E-01]	7.33E-05 (2.41E-04) [5.32E-07, 5.54E-03]	1.03E-03 (6.01E-03) [5.32E-07, 2.46E-01]
Dimethyl phthalates	Tons emitted	2.40E-04 (1.63E-03) [7.75E-08, 3.76E-02]	2.01E-04 (1.43E-03) [9.54E-08, 1.84E-02]	1.44E-04 (1.30E-03) [0, 2.76E-02]	4.62E-05 (5.58E-04) [1.30E-09, 1.28E-02]	1.62E-04 (1.33E-03) [0, 3.76E-02]
Dimethyl sulfate	Tons emitted	3.14E-06 (1.55E-05) [0, 3.35E-04]	7.71E-06 (9.77E-05) [0, 1.67E-03]	1.01E-06 (7.34E-06) [0, 1.80E-04]	3.44E-07 (1.21E-06) [0, 1.73E-05]	2.30E-06 (3.29E-05) [0, 1.67E-03]
Epichlorohydrin	Tons emitted	1.53E-04 (1.91E-03) [0, 5.71E-02]	1.24E-05 (8.63E-05) [0, 1.40E-03]	1.23E-05 (1.30E-04) [0, 2.85E-03]	7.01E-06 (1.31E-04) [0, 3.31E-03]	5.99E-05 (1.13E-03) [0, 5.71E-02]
Ethyl acrylate	Tons emitted	1.10E-04 (6.10E-04) [0, 1.10E-02]	3.41E-05 (2.25E-04) [0, 3.26E-03]	1.13E-05 (1.07E-04) [0, 2.59E-03]	1.09E-05 (1.17E-04) [0, 2.32E-03]	4.76E-05 (3.78E-04) [0, 1.10E-02]
Ethyl chloride	Tons emitted	3.25E-03 (1.94E-02) [1.94E-06, 5.22E-01]	1.34E-03 (1.47E-03) [1.27E-06, 2.08E-02]	4.96E-04 (9.94E-04) [0, 2.94E-02]	1.43E-04 (3.75E-04) [6.74E-07, 8.29E-03]	0.001 (0.012) [0, 0.522]
Ethylene dibromide	Tons emitted	4.59E-03 (3.64E-03) [8.26E-05, 1.97E-02]	3.26E-03 (1.43E-03) [8.66E-05, 6.87E-03]	7.39E-04 (8.23E-04) [7.16E-05, 4.83E-03]	2.51E-04 (1.66E-04) [7.18E-05, 1.05E-03]	2.23E-03 (2.94E-03) [7.16E-05, 1.97E-02]
Ethylene dichloride	Tons emitted	0.011 (0.007) [0.001, 0.088]	0.010 (0.003) [0.003, 0.045]	0.005 (0.003) [0.001, 0.050]	0.002 (0.002) [0.001, 0.020]	0.007 (0.006) [0.001, 0.088]
Ethylene glycol	Tons emitted	1.31E-01 (1.74E-01) [4.27E-04, 1.43E+00]	0.090 (0.214) [0.002, 3.089]	2.70E-02 (5.91E-02) [3.72E-05, 8.75E-01]	5.35E-03 (1.10E-02) [6.49E-06, 1.63E-01]	6.49E-02 (1.38E-01) [6.49E-06, 3.09E+00]

**Table 3.(continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

Variable	Units	Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
		Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Ethylene oxide	Tons emitted	4.87E-03 (5.12E-03) [3.41E-04, 6.56E-02]	3.53E-03 (3.43E-03) [3.31E-04, 2.76E-02]	2.42E-03 (2.53E-03) [3.07E-04, 2.99E-02]	1.46E-03 (1.76E-03) [2.67E-04, 1.57E-02]	3.18E-03 (3.87E-03) [2.67E-04, 6.56E-02]
Ethylidene dichloride	Tons emitted	3.73E-04 (1.20E-03) [6.21E-09, 1.53E-02]	1.60E-04 (3.09E-04) [0, 3.84E-03]	9.69E-05 (2.91E-04) [0, 6.08E-03]	3.94E-05 (1.70E-04) [0, 3.11E-03]	1.87E-04 (7.53E-04) [0, 1.53E-02]
Glycol ethers	Tons emitted	3.14E-02 (5.43E-02) [1.34E-04, 7.83E-01]	2.04E-02 (2.91E-02) [3.44E-04, 2.04E-01]	1.00E-02 (2.16E-02) [1.71E-05, 3.66E-01]	4.59E-03 (1.63E-02) [5.93E-06, 3.13E-01]	1.73E-02 (3.80E-02) [5.93E-06, 7.83E-01]
Hexachlorobenzene	Tons emitted	3.16E-06 (3.42E-05) [1.13E-10, 9.59E-04]	8.63E-07 (3.25E-06) [0, 5.59E-05]	5.69E-07 (2.52E-06) [0, 6.57E-05]	1.82E-07 (4.93E-07) [8.76E-10, 5.96E-06]	1.41E-06 (2.03E-05) [0, 9.59E-04]
Hexachlorobutadiene	Tons emitted	1.62E-06 (1.67E-05) [0, 3.76E-04]	6.20E-07 (5.70E-06) [0, 8.08E-05]	1.44E-07 (1.18E-06) [0, 2.09E-05]	2.29E-06 (5.60E-05) [0, 1.45E-03]	1.16E-06 (2.77E-05) [0, 1.45E-03]
Hexachlorocyclopentadiene	Tons emitted	6.11E-05 (1.88E-03) [0, 6.20E-02]	6.79E-05 (1.11E-03) [0, 1.99E-02]	6.47E-07 (7.44E-06) [0, 1.60E-04]	3.42E-06 (6.71E-05) [0, 1.69E-03]	2.91E-05 (1.16E-03) [0, 6.20E-02]
Hexane	Tons emitted	0.245 (0.345) [0.005, 4.984]	0.148 (0.156) [0.018, 1.461]	0.093 (0.540) [0.001, 14.485]	3.43E-02 (3.05E-01) [1.49E-04, 7.89E+00]	1.39E-01 (4.11E-01) [1.49E-04, 1.45E+01]
Hydrazine	Tons emitted	1.61E-05 (2.35E-04) [8.37E-08, 6.81E-03]	6.53E-06 (4.10E-05) [8.31E-08, 6.24E-04]	4.07E-06 (4.78E-05) [7.22E-08, 1.44E-03]	2.02E-06 (1.58E-05) [7.22E-08, 3.78E-04]	8.06E-06 (1.42E-04) [7.22E-08, 6.81E-03]
Hydrochloric acid	Tons emitted	5.13E-01 (1.42E+00) [3.36E-04, 1.68E+01]	0.259 (1.178) [0.002, 15.970]	1.74E-01 (8.97E-01) [2.77E-05, 1.66E+01]	4.53E-02 (1.51E-01) [1.62E-05, 2.04E+00]	2.73E-01 (1.08E+00) [1.62E-05, 1.68E+01]
Isophorone	Tons emitted	1.96E-04 (9.98E-04) [0, 2.26E-02]	9.07E-05 (1.95E-04) [0, 1.75E-03]	6.37E-05 (2.41E-04) [0, 4.32E-03]	2.94E-05 (2.15E-04) [0, 5.39E-03]	1.05E-04 (6.19E-04) [0, 2.26E-02]
Lead compounds	Tons emitted	2.23E-03 (3.84E-03) [3.41E-04, 8.17E-02]	1.43E-03 (1.65E-03) [3.51E-04, 1.45E-02]	9.34E-04 (2.21E-03) [2.98E-04, 4.74E-02]	6.01E-04 (1.48E-03) [2.74E-04, 2.35E-02]	1.36E-03 (2.82E-03) [2.74E-04, 8.17E-02]
Manganese compounds	Tons emitted	3.24E-03 (1.79E-02) [3.87E-04, 3.78E-01]	2.18E-03 (6.52E-03) [3.68E-04, 9.12E-02]	1.49E-03 (5.71E-03) [3.52E-04, 1.12E-01]	7.26E-04 (1.67E-03) [2.92E-04, 2.75E-02]	2.01E-03 (1.13E-02) [2.92E-04, 3.78E-01]
Mercury compounds	Tons emitted	5.61E-04 (1.52E-04) [5.00E-04, 4.26E-03]	5.34E-04 (8.45E-05) [5.00E-04, 1.62E-03]	5.19E-04 (1.34E-04) [5.00E-04, 4.36E-03]	5.07E-04 (3.35E-05) [5.00E-04, 1.04E-03]	5.33E-04 (1.25E-04) [5.00E-04, 4.36E-03]
Methanol	Tons emitted	0.424 (1.309) [0.002, 39.557]	0.280 (0.454) [0.016, 6.764]	1.05E-01 (2.08E-01) [4.82E-04, 4.24E+00]	2.96E-02 (6.00E-02) [7.19E-05, 7.59E-01]	2.17E-01 (8.11E-01) [7.19E-05, 3.96E+01]

**Table 3. (continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

Variable	Units	Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
		Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Methyl isobutyl ketone	Tons emitted	1.71E-01 (2.20E-01) [2.57E-04, 2.30E+00]	0.121 (0.188) [0.002, 2.004]	5.06E-02 (1.59E-01) [1.79E-05, 4.30E+00]	9.35E-03 (1.98E-02) [7.04E-07, 2.53E-01]	9.06E-02 (1.82E-01) [7.04E-07, 4.30E+00]
Methyl methacrylate	Tons emitted	1.53E-03 (5.28E-03) [3.45E-07, 6.05E-02]	8.16E-04 (3.80E-03) [8.35E-06, 5.37E-02]	7.63E-04 (5.53E-03) [1.10E-07, 1.04E-01]	2.17E-04 (2.49E-03) [2.22E-08, 5.26E-02]	9.18E-04 (4.80E-03) [2.22E-08, 1.04E-01]
Methyl chloride	Tons emitted	0.890 (0.094) [0.827, 2.398]	0.863 (0.076) [0.834, 2.023]	0.851 (0.067) [0.827, 2.312]	0.842 (0.036) [0.818, 1.572]	0.864 (0.076) [0.818, 2.398]
Methylhydrazine	Tons emitted	3.60E-06 (4.47E-06) [0, 4.27E-05]	2.65E-06 (3.87E-06) [0, 2.88E-05]	1.96E-06 (3.28E-06) [0, 3.05E-05]	1.61E-06 (2.76E-06) [0, 2.37E-05]	2.53E-06 (3.80E-06) [0, 4.27E-05]
Methyl tert-butyl ether	Tons emitted	2.17E-01 (4.65E-01) [1.34E-04, 5.11E+00]	5.33E-02 (6.67E-02) [2.70E-04, 5.61E-01]	2.56E-02 (3.83E-02) [8.88E-06, 5.74E-01]	8.11E-03 (1.69E-02) [2.71E-06, 2.73E-01]	9.12E-02 (2.91E-01) [2.71E-06, 5.11E+00]
Nitrobenzene	Tons emitted	1.15E-05 (1.22E-04) [0, 3.49E-03]	1.56E-06 (6.15E-06) [0, 7.15E-05]	9.29E-07 (7.20E-06) [0, 1.41E-04]	3.07E-07 (3.00E-06) [0, 5.12E-05]	4.52E-06 (7.24E-05) [0, 3.49E-03]
N,N-dimethylaniline	Tons emitted	6.74E-05 (1.18E-04) [0, 2.04E-03]	3.67E-05 (2.55E-05) [0, 1.62E-04]	1.54E-05 (4.39E-05) [0, 1.24E-03]	3.47E-06 (4.68E-06) [0, 3.43E-05]	3.31E-05 (7.90E-05) [0, 2.04E-03]
o-toluidine	Tons emitted	3.09E-06 (2.20E-05) [0, 3.78E-04]	5.36E-06 (8.12E-05) [0, 1.46E-03]	1.39E-06 (3.58E-05) [0, 1.16E-03]	7.23E-08 (7.09E-07) [0, 1.56E-05]	2.10E-06 (3.58E-05) [0, 1.46E-03]
Polycyclic aromatic hydrocarbon compounds/ polycyclic organic matter	Tons emitted	1.62E-02 (3.00E-02) [1.79E-04, 4.45E-01]	0.014 (0.021) [0.001, 0.139]	7.66E-03 (1.58E-02) [2.64E-05, 3.36E-01]	3.20E-03 (7.15E-03) [4.44E-05, 1.25E-01]	1.03E-02 (2.19E-02) [2.64E-05, 4.45E-01]
Pentachlorophenol	Tons emitted	2.21E-06 (1.34E-05) [0, 2.68E-04]	1.37E-06 (4.02E-06) [0, 6.14E-05]	2.59E-06 (3.92E-05) [0, 1.06E-03]	3.90E-07 (1.82E-06) [0, 3.75E-05]	1.86E-06 (2.41E-05) [0, 1.06E-03]
Phosphine	Tons emitted	4.33E-05 (9.63E-05) [0, 1.47E-03]	4.14E-05 (7.15E-05) [0, 7.66E-04]	4.20E-05 (5.58E-05) [0, 5.70E-04]	3.75E-05 (6.22E-05) [0, 8.28E-04]	4.14E-05 (7.49E-05) [0, 1.47E-03]
Phosphorus	Tons emitted	9.41E-05 (9.30E-04) [0, 2.61E-02]	4.27E-05 (3.17E-04) [0, 4.89E-03]	4.90E-05 (8.38E-04) [0, 2.59E-02]	1.84E-05 (1.41E-04) [0, 2.20E-03]	5.75E-05 (7.43E-04) [0, 2.61E-02]
Polychlorinated biphenyls	Tons emitted	1.71E-04 (4.16E-05) [1.27E-04, 5.94E-04]	1.84E-04 (3.62E-05) [1.27E-04, 3.47E-04]	1.69E-04 (2.06E-04) [1.27E-04, 6.27E-03]	1.43E-04 (6.60E-05) [1.27E-04, 1.59E-03]	1.66E-04 (1.27E-04) [1.27E-04, 6.27E-03]
Propylene dichloride	Tons emitted	5.35E-03 (3.39E-03) [3.09E-04, 3.60E-02]	4.51E-03 (1.19E-03) [1.12E-03, 9.46E-03]	2.14E-03 (1.70E-03) [3.07E-04, 2.85E-02]	5.96E-04 (6.36E-04) [2.71E-04, 5.08E-03]	3.17E-03 (2.97E-03) [2.71E-04, 3.60E-02]



**Table 3. (continued) Air Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

Variable	Units	Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
		Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Propylene oxide	Tons emitted	5.90E-04 (2.01E-03) [2.90E-06, 4.27E-02]	2.28E-04 (5.80E-04) [6.33E-06, 8.58E-03]	2.05E-04 (1.74E-03) [4.34E-07, 4.46E-02]	3.28E-05 (7.97E-05) [1.46E-07, 1.00E-03]	3.04E-04 (1.58E-03) [1.46E-07, 4.46E-02]
Quinoline	Tons emitted	1.22E-04 (3.46E-04) [5.59E-07, 8.65E-03]	1.12E-04 (2.22E-04) [5.69E-07, 9.12E-04]	5.81E-05 (1.40E-04) [5.13E-07, 8.52E-04]	2.68E-05 (7.97E-05) [4.89E-07, 6.88E-04]	7.90E-05 (2.37E-04) [4.89E-07, 8.65E-03]
Selenium compounds	Tons emitted	1.54E-04 (3.63E-04) [2.60E-07, 4.96E-03]	6.78E-05 (1.10E-04) [8.80E-07, 1.39E-03]	4.38E-05 (1.57E-04) [6.22E-09, 3.40E-03]	1.50E-05 (4.10E-05) [5.72E-10, 5.36E-04]	7.82E-05 (2.43E-04) [5.72E-10, 4.96E-03]
Styrene	Tons emitted	0.046 (0.076) [0.001, 1.345]	0.043 (0.092) [0.002, 0.952]	3.08E-02 (1.11E-01) [8.54E-05, 2.15E+00]	7.82E-03 (3.40E-02) [3.59E-05, 6.78E-01]	3.24E-02 (8.62E-02) [3.59E-05, 2.15E+00]
Tetrachloroethylene	Tons emitted	0.104 (0.121) [0.022, 1.534]	0.060 (0.043) [0.034, 0.414]	0.037 (0.019) [0.020, 0.199]	0.024 (0.005) [0.017, 0.111]	0.060 (0.081) [0.017, 1.534]
Toluene	Tons emitted	1.756 (1.333) [0.052, 14.898]	1.123 (0.465) [0.401, 4.857]	0.561 (0.457) [0.037, 10.023]	0.191 (0.177) [0.030, 1.236]	0.954 (1.057) [0.030, 14.898]
Trichloroethylene	Tons emitted	0.063 (0.060) [0.005, 1.079]	0.049 (0.048) [0.005, 0.440]	0.035 (0.036) [0.005, 0.495]	0.023 (0.025) [0.005, 0.198]	0.043 (0.048) [0.005, 1.079]
Triethylamine	Tons emitted	9.42E-04 (6.80E-03) [5.43E-07, 1.79E-01]	4.97E-04 (2.28E-03) [2.74E-06, 2.97E-02]	2.63E-04 (2.36E-03) [4.40E-08, 6.24E-02]	3.06E-05 (1.20E-04) [7.82E-09, 1.56E-03]	4.73E-04 (4.31E-03) [7.82E-09, 1.79E-01]
Vinyl acetate	Tons emitted	1.68E-03 (9.99E-03) [8.63E-07, 1.64E-01]	1.49E-03 (1.43E-02) [6.33E-06, 2.40E-01]	3.33E-04 (2.48E-03) [1.16E-07, 6.16E-02]	1.85E-04 (2.08E-03) [2.11E-08, 4.95E-02]	8.86E-04 (7.68E-03) [2.11E-08, 2.40E-01]
Vinyl chloride	Tons emitted	1.10E-02 (1.09E-02) [5.00E-06, 1.05E-01]	6.93E-03 (3.54E-03) [1.27E-06, 1.97E-02]	1.33E-03 (3.75E-03) [4.37E-09, 9.41E-02]	1.60E-04 (1.09E-03) [6.99E-10, 2.56E-02]	4.99E-03 (8.36E-03) [6.99E-10, 1.05E-01]
Vinylidene chloride	Tons emitted	1.54E-04 (4.95E-04) [3.32E-08, 1.34E-02]	7.72E-05 (2.01E-04) [0, 3.60E-03]	3.42E-05 (1.39E-04) [5.19E-09, 4.03E-03]	1.78E-05 (2.22E-04) [0, 5.74E-03]	7.67E-05 (3.31E-04) [0, 1.34E-02]

NOTE: Calculated with nontransformed data

## Water Domain

The variables included in the water domain demonstrated moderate variability across the rural/urban strata. The metropolitan-urbanized and nonmetropolitan-urbanized strata both had higher overall impaired stream length (14.00% and 14.20%, respectively), compared with the less urbanized and thinly populated strata (8.79% and 6.54%, respectively) (Table 4). The urban stratum also demonstrated a higher number of discharge permits per stream length than did the rural stratum. The thinly populated stratum

had the highest percentage of population on self-supplied sources (35.61%) and the lowest percentage of population on surface water sources (21.94%). Although most chemical contaminants demonstrated similar concentrations across the rural/urban strata, there were a few differences. Fluoride and di(2-ethylhexyl) adipate were present in higher concentrations on the metropolitan-urbanized stratum. There was little variability across urban/rural strata for atmospheric deposition of chemicals and percent of land in extreme drought.

**Table 4. Water Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

		Metropolitan- Urbanized (RUCC1 = 089)	Nonmetropolitan-Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
Variable	Units	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Water Domain						
Construct: Overall Water Quality						
Percent of stream length impaired in county	%	14.004 (16.528) [0, 92.570]	14.203 (20.403) [0, 94.450]	8.791 (12.682) [0, 95.740]	6.537 (9.470) [0, 98.500]	10.674 (14.853) [0, 98.500]
Construct: General Water Contamination						
Sewage permits	permits/ 1000 km	2.227 (7.217) [0, 111.570]	2.176 (5.565) [0, 65.970]	1.116 (6.136) [0, 131.620]	0.323 (1.342) [0, 15.400]	1.441 (5.905) [0, 131.620]
Industrial permits	permits/ 1000 km	51.139 (96.466) [0, 1195.680]	27.241 (31.332) [0, 280.860]	18.423 (38.732) [0, 674.150]	10.080 (22.009) [0, 337.300]	28.893 (64.947) [0, 1195.680]
Stormwater permits	permits/ 1000 km	39.080 (157.506) [0, 2253.860]	9.865 (32.657) [0, 325.640]	4.737 (13.711) [0, 183.790]	1.731 (5.524) [0, 65.200]	16.530 (95.130) [0, 2253.860]
Construct: Recreational Water Quality						
Number of days of beach closure	days	3.229 (19.625) [0, 365.000]	1.421 (9.859) [0, 116.000]	0.143 (1.945) [0, 55.000]	0.022 (0.508) [0, 13.000]	1.318 (12.118) [0, 365.000]
Number of days beach closure for contamination advisory events	days	2.795 (13.074) [0, 157.000]	3.254 (22.401) [0, 364.000]	0.325 (4.025) [0, 110.000]	0.216 (2.915) [0, 64.000]	1.459 (10.939) [0, 364.000]
Number of days beach closure for rain advisory events	days	0.144 (1.630) [0, 34.000]	0.037 (0.423) [0, 7.000]	0.002 (0.061) [0, 2.000]	0.009 (0.232) [0, 6.000]	0.056 (0.987) [0, 34.000]
Construct: Domestic Use						
Percent of population on self supply	%	22.337 (21.251) [0, 98.250]	22.067 (15.447) [0, 75.680]	28.292 (19.944) [0, 99.028]	35.608 (23.612) [0, 100.000]	27.148 (21.451) [0, 100.000]
Percent of public supply population that is on surface water	%	46.863 (41.736) [0, 100.000]	41.922 (41.306) [0, 100.000]	33.775 (40.841) [0, 100.000]	21.942 (36.526) [0, 100.000]	36.627 (41.386) [0, 100.000]
Construct: Atmospheric Deposition						
Calcium precipitation weighted mean	mg/L	0.192 (0.120) [0.040, 0.594]	0.217 (0.130) [0.043, 0.634]	0.255 (0.144) [0.042, 1.183]	0.279 (0.144) [0.047, 0.806]	0.231 (0.139) [0.040, 1.183]
Magnesium (precipitation weighted mean	mg/L	0.058 (0.046) [0.011, 0.787]	0.065 (0.075) [0.011, 1.064]	0.071 (0.100) [0.008, 1.288]	0.089 (0.132) [0.011, 1.284]	0.070 (0.092) [0.008, 1.288]
Potassium precipitation weighted mean	mg/L	0.124 (0.063) [0.025, 0.752]	0.133 (0.084) [0.027, 1.001]	0.151 (0.106) [0.037, 1.192]	0.180 (0.132) [0.031, 1.189]	0.146 (0.100) [0.025, 1.192]
Sodium precipitation weighted mean	mg/L	0.156 (0.149) [0.021, 1.221]	0.148 (0.168) [0.023, 1.228]	0.127 (0.142) [0.019, 1.730]	0.109 (0.145) [0.020, 1.543]	0.135 (0.149) [0.019, 1.730]
Ammonium precipitation weighted mean	mg/L	0.230 (0.103) [0.005, 0.588]	0.243 (0.120) [0, 0.758]	0.260 (0.129) [0.003, 0.707]	0.312 (0.160) [0.012, 0.625]	0.259 (0.131) [0, 0.758]
Nitrate precipitation weighted mean	mg/L	0.944 (0.303) [0.029, 1.598]	0.952 (0.343) [0.021, 1.608]	0.938 (0.291) [0.002, 1.600]	0.959 (0.285) [0.012, 1.588]	0.946 (0.300) [0, 1.608]



**Table 4. (continued) Water Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

Variable	Units	Metropolitan- Urbanized (RUCC1 = 089)	Nonmetropolitan-Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
		Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Chloride precipitation weighted mean	mg/L	0.273 (0.248) [0.040, 1.886]	0.250 (0.267) [0.036, 1.726]	0.203 (0.199) [0.039, 2.326]	0.163 (0.177) [0.040, 1.863]	0.224 (0.225) [0.036, 2.326]
Sulfate precipitation weighted mean	mg/L	1.263 (0.456) [0.144, 2.267]	1.217 (0.496) [0.152, 2.338]	1.132 (0.419) [0.013, 2.388]	1.011 (0.364) [0.047, 2.208]	1.160 (0.440) [0.013, 2.388]
Total Mercury deposition	ng/m <sup>2</sup>	4.784 (1.249) [1.101, 9.219]	4.635 (1.364) [1.100, 7.950]	4.780 (1.397) [1.109, 8.473]	4.520 (1.405) [1.103, 8.458]	4.711 (1.350) [1.100, 9.219]
Construct: Drought						
Percent of county drought— extreme (D3-D4)	%	3.160 (5.273) [0, 46.900]	3.522 (6.215) [0, 42.430]	3.908 (6.931) [0, 40.400]	5.030 (8.577) [0, 48.800]	3.848 (6.777) [0, 48.800]
Construct: Chemical Contamination						
Arsenic	mg/L	2.46E-03 (5.22E-03) [0, 1.33E-01]	2.59E-03 (3.47E-03) [0, 3.80E-02]	2.70E-03 (5.09E-03) [0, 7.10E-02]	1.72E-03 (3.22E-03) [0, 3.00E-02]	2.46E-03 (4.67E-03) [0, 1.33E-01]
Barium	mg/L	0.074 (0.406) [0, 13.100]	0.074 (0.232) [0, 3.970]	0.055 (0.093) [0, 1.020]	0.041 (0.085) [0, 1.010]	0.060 (0.260) [0, 13.100]
Cadmium	mg/L	7.30E-04 (8.64E-04) [0, 5.00E-03]	6.50E-04 (7.95E-04) [0, 6.00E-03]	6.48E-04 (7.68E-04) [0, 7.00E-03]	4.63E-04 (6.92E-04) [0, 6.00E-03]	6.37E-04 (7.96E-04) [0, 7.00E-03]
Chromium	mg/L	5.29E-03 (7.37E-03) [0, 1.45E-01]	5.15E-03 (5.68E-03) [0, 3.50E-02]	5.10E-03 (7.29E-03) [0, 5.50E-02]	3.40E-03 (6.42E-03) [0, 1.00E-01]	4.81E-03 (7.03E-03) [0, 1.45E-01]
Cyanide	mg/L	0.014 (0.028) [0, 0.266]	0.016 (0.027) [0, 0.100]	0.015 (0.032) [0, 0.338]	0.014 (0.041) [0, 0.815]	0.014 (0.033) [0, 0.82]
Fluoride	mg/L	1.195 (8.080) [0, 150.310]	0.381 (0.408) [0, 2.630]	0.462 (0.644) [0, 8.690]	0.344 (0.661) [0, 11.360]	0.683 (4.797) [0, 150.310]
Mercury (inorganic)	mg/L	1.25E-04 (4.95E-04) [0, 1.00E-02]	9.91E-05 (3.09E-04) [0, 2.00E-03]	1.13E-04 (1.11E-03) [0, 3.50E-02]	7.61E-05 (3.40E-04) [0, 6.00E-03]	1.08E-04 (7.33E-04) [0, 3.50E-02]
Nitrate	mg/L	0.801 (1.650) [0, 20.000]	0.660 (1.191) [0, 14.610]	0.733 (2.786) [0, 81.000]	0.606 (1.952) [0, 32.830]	0.722 (2.127) [0, 81.000]
Nitrite	mg/L	0.061 (0.182) [0, 3.590]	0.055 (0.139) [0, 1.890]	0.045 (0.113) [0, 1.530]	0.043 (0.169) [0, 3.400]	0.051 (0.155) [0, 3.590]
Selenium	mg/L	3.13E-03 (4.73E-03) [0, 5.00E-02]	2.93E-03 (3.65E-03) [0, 3.00E-02]	3.00E-03 (5.12E-03) [0, 9.40E-02]	2.25E-03 (4.45E-03) [0, 4.70E-02]	4.72E-03 (2.88E-03) [0, 9.40E-02]
Antimony	mg/L	1.55E-03 (1.79E-03) [0, 1.90E-02]	1.46E-03 (1.57E-03) [0, 6.00E-03]	1.45E-03 (1.62E-03) [0, 6.00E-03]	1.05E-03 (1.46E-03) [0, 6.00E-03]	1.40E-03 (1.65E-03) [0, 1.90E-02]
Beryllium	mg/L	9.18E-06 (3.03E-04) [0, 1.00E-02]	0 (0) [0, 0]	0.015 (0.492) [0, 16.000]	2.99E-05 (5.46E-04) [0, 1.00E-02]	5.11E-03 (2.85E-01) [0, 1.60E+01]
Thallium	mg/L	6.52E-04 (6.57E-04) [0, 4.00E-03]	6.16E-04 (5.96E-04) [0, 2.00E-03]	6.03E-04 (6.34E-04) [0, 4.00E-03]	4.57E-04 (6.09E-04) [0, 6.00E-03]	5.90E-04 (6.37E-04) [0, 6.00E-03]
Endrin	mg/L	0.067 (0.195) [0, 1.000]	0.063 (0.181) [0, 1.000]	0.073 (0.213) [0, 1.000]	0.047 (0.172) [0, 1.000]	0.064 (0.195) [0, 1.000]
Lindane	mg/L	0.074 (0.406) [0, 13.100]	0.074 (0.232) [0, 3.970]	0.055 (0.093) [0, 1.020]	0.041 (0.085) [0, 1.010]	0.060 (0.260) [0, 13.100]

**Table 4. (continued) Water Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

Variable	Units	Metropolitan- Urbanized (RUCC1 = 089)	Nonmetropolitan-Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
		Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Methoxychlor	µg/L	0.666 (1.958) [0, 10.000]	0.605 (1.706) [0, 10.000]	0.420 (1.307) [0, 9.640]	0.150 (0.594) [0, 8.000]	0.467 (1.521) [0, 10.000]
Toxaphene	µg/L	0.395 (0.495) [0, 5.000]	0.464 (0.499) [0, 3.000]	0.385 (0.516) [0, 5.000]	0.288 (0.449) [0, 1.000]	0.375 (0.496) [0, 5.000]
Dalapon	µg/L	7.120 (22.565) [0, 100.000]	9.045 (25.358) [0, 100.000]	8.085 (24.497) [0, 100.000]	7.903 (25.207) [0, 100.000]	7.808 (24.086) [0, 100.000]
di(2-Ethylhexyl) adipate	µg/L	11.680 (303.985) [0, 10030.000]	3.620 (10.814) [0, 50.000]	2.947 (17.476) [0, 501.000]	1.243 (5.627) [0, 50.000]	5.679 (179.303) [0, 10030.000]
Oxamyl (Vydate)	µg/L	0.774 (0.947) [0, 3.000]	0.890 (0.968) [0, 2.000]	0.771 (0.944) [0, 3.500]	0.534 (0.861) [0, 2.000]	0.723 (0.936) [0, 3.500]
Simazine	µg/L	0.178 (0.319) [0, 4.840]	0.174 (0.253) [0, 1.010]	0.171 (0.311) [0, 5.000]	0.108 (0.231) [0, 1.000]	0.160 (0.294) [0, 5.000]
di(2-Ethylhexyl) phthalate	µg/L	0.767 (1.257) [0, 9.330]	0.834 (1.226) [0, 6.000]	0.704 (1.294) [0, 15.830]	0.416 (0.898) [0, 9.070]	0.677 (1.207) [0, 15.830]
Picloram	µg/L	2.263 (9.736) [0, 50.000]	3.878 (12.409) [0, 50.000]	2.597 (10.458) [0, 100.000]	1.136 (6.237) [0, 50.000]	2.301 (9.712) [0, 100.000]
Dinoseb	µg/L	0.416 (0.211) [0, 3.000]	0.254 (0.439) [0, 2.000]	0.212 (0.470) [0, 9.000]	0.172 (0.382) [0, 2.000]	0.208 (0.431) [0, 9.000]
Hexachlorocyclopentadiene	µg/L	0.045 (0.050) [0, 0.295]	0.052 (0.050) [0, 0.200]	0.047 (0.050) [0, 0.900]	0.035 (0.048) [0, 0.117]	0.044 (0.049) [0, 0.295]
Carbofuran	µg/L	0.372 (0.441) [0, 0.900]	0.416 (0.444) [0, 0.900]	0.352 (0.436) [0, 0.900]	0.257 (0.404) [0, 0.900]	0.345 (0.435) [0, 0.900]
Atrazine	µg/L	0.179 (0.319) [0, 2.500]	0.176 (0.260) [0, 2.000]	0.245 (2.333) [0, 75.230]	0.104 (0.225) [0, 2.000]	0.185 (1.374) [0, 75.230]
Alachlor	µg/L	0.176 (0.303) [0, 2.000]	0.164 (0.237) [0, 2.000]	0.160 (0.288) [0, 2.500]	0.116 (0.228) [0, 2.000]	0.156 (0.278) [0, 2.500]
Heptachlor	µg/L	0.018 (0.020) [0, 0.040]	0.020 (0.020) [0, 0.040]	0.019 (0.020) [0, 0.040]	0.014 (0.019) [0, 0.040]	0.018 (0.020) [0, 0.040]
Heptachlor epoxide	µg/L	9.33E-03 (9.95E-03) [0, 4.00E-02]	1.07E-02 (9.90E-03) [0, 2.00E-02]	9.38E-03 (9.95E-03) [0, 2.00E-02]	7.10E-03 (9.95E-03) [0, 2.00E-02]	8.99E-03 (9.92E-03) [0, 4.00E-02]
2,4-Dichlorophenoxyacetic acid	µg/L	0.047 (0.084) [0, 2.030]	0.061 (0.144) [0, 2.420]	0.051 (0.224) [0, 7.100]	0.033 (0.054) [0, 0.720]	0.047 (0.149) [0, 7.100]
Silvex	µg/L	0.384 (1.020) [0, 5.000]	0.579 (1.836) [0, 25.250]	0.384 (1.087) [0, 12.500]	0.184 (0.633) [0, 5.000]	0.362 (1.096) [0, 25.250]
Hexachlorobenzene	µg/L	0.045 (0.049) [0, 0.100]	0.050 (0.049) [0, 0.100]	0.047 (0.058) [0, 1.050]	0.035 (0.047) [0, 0.100]	0.044 (0.052) [0, 1.050]
Benzo[a]pyrene	µg/L	0.038 (0.054) [0, 0.337]	0.040 (0.057) [0, 0.324]	0.043 (0.060) [0, 0.300]	0.029 (0.050) [0, 0.200]	0.038 (0.056) [0, 0.337]
Pentachlorophenol	µg/L	0.068 (0.163) [0, 1.700]	0.076 (0.169) [0, 1.000]	0.079 (0.179) [0, 1.000]	0.054 (0.138) [0, 1.000]	0.069 (0.165) [0, 1.700]
1,2,4-Trichlorobenzene	µg/L	0.370 (0.426) [0, 11.880]	0.379 (0.363) [0, 5.170]	0.367 (0.225) [0, 1.200]	0.315 (0.252) [0, 2.070]	0.358 (0.328) [0, 11.880]
Polychlorinated biphenyls	µg/L	0.108 (1.232) [0, 40.360]	0.057 (0.127) [0, 1.000]	0.052 (0.186) [0, 4.250]	0.024 (0.075) [0, 1.000]	0.066 (0.735) [0, 40.360]
1,2-Dibromo-3-chloropropane	µg/L	0.012 (0.020) [0, 0.535]	0.010 (0.010) [0, 0.052]	0.010 (0.010) [0, 0.035]	0.009 (0.010) [0, 0.020]	0.011 (0.014) [0, 0.535]

**Table 4. (continued) Water Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

Variable	Units	Metropolitan- Urbanized (RUCC1 = 089)	Nonmetropolitan-Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
		Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Ethylene dibromide	µg/L	0.071 (0.158) [0, 1.160]	0.057 (0.135) [0, 0.500]	0.062 (0.145) [0, 0.860]	0.074 (0.160) [0, 0.500]	0.067 (0.152) [0, 1.160]
Xylenes	µg/L	0.751 (6.233) [0, 200.330]	0.791 (3.373) [0, 50.710]	1.854 (43.030) [0, 1400.250]	1.861 (38.631) [0, 1000.240]	1.363 (30.927) [0, 1400.250]
Chlordane	µg/L	0.088 (0.100) [0, 0.950]	0.099 (0.096) [0, 0.273]	0.090 (0.097) [0, 0.267]	0.068 (0.094) [0, 0.200]	0.086 (0.098) [0, 0.950]
Dichloromethane (Methylene chloride)	µg/L	0.503 (0.407) [0, 10.240]	0.380 (0.271) [0, 1.880]	0.390 (0.309) [0, 3.950]	0.335 (0.504) [0, 11.670]	0.383 (0.427) [0, 11.670]
1,2-Dichlorobenzene (o-Dichlorobenzene)	µg/L	0.349 (0.288) [0, 6.130]	0.346 (0.231) [0, 1.030]	0.352 (0.226) [0, 1.000]	0.296 (0.242) [0, 1.000]	0.338 (0.254) [0, 6.130]
1,4-Dichlorobenzene (p-Dichlorobenzene)	µg/L	0.505 (5.310) [0, 175.380]	0.342 (0.244) [0, 1.520]	0.337 (0.256) [0, 2.750]	0.297 (0.352) [0, 6.000]	0.387 (3.135) [0, 175.380]
Vinyl chloride	µg/L	0.264 (0.350) [0, 4.850]	0.351 (0.224) [0, 0.740]	0.361 (0.244) [0, 3.830]	0.305 (0.236) [0, 0.500]	0.344 (0.248) [0, 4.850]
1,1-Dichloroethylene	µg/L	0.362 (0.261) [0, 2.220]	0.362 (0.259) [0, 2.130]	0.363 (0.239) [0, 2.750]	0.304 (0.242) [0, 1.000]	0.350 (0.251) [0, 2.750]
trans-1,2-Dichloroethylene	µg/L	0.340 (0.261) [0, 4.550]	0.336 (0.263) [0, 1.300]	0.346 (0.235) [0, 2.750]	0.290 (0.239) [0, 0.750]	0.331 (0.246) [0, 4.550]
1,2-Dichloroethane (Ethylene dichloride)	µg/L	0.370 (0.426) [0, 11.880]	0.379 (0.363) [0, 5.170]	0.367 (0.225) [0, 1.200]	0.315 (0.252) [0, 2.070]	0.358 (0.328) [0, 11.880]
1,1,1-Trichloroethane	µg/L	0.697 (10.637) [0, 351.230]	0.748 (6.965) [0, 125.380]	0.383 (0.935) [0, 30.250]	0.297 (0.249) [0, 2.150]	0.511 (6.672) [0, 351.230]
Carbon tetrachloride	µg/L	0.370 (0.289) [0, 4.100]	0.383 (0.384) [0, 5.400]	0.379 (0.256) [0, 2.600]	0.320 (0.285) [0, 4.130]	0.364 (0.290) [0, 5.400]
1,2-Dichloropropane	µg/L	0.360 (0.232) [0, 1.270]	0.364 (0.243) [0, 1.900]	0.368 (0.217) [0, 0.560]	0.313 (0.240) [0, 0.620]	0.353 (0.231) [0, 1.900]
Trichloroethylene	µg/L	0.428 (0.501) [0, 6.480]	0.378 (0.274) [0, 2.010]	0.374 (0.270) [0, 3.730]	0.314 (0.252) [0, 1.190]	0.380 (0.367) [0, 6.480]
1,1,2-Trichloroethane	µg/L	0.358 (0.248) [0, 3.050]	0.357 (0.224) [0, 0.500]	0.375 (0.351) [0, 9.330]	0.312 (0.240) [0, 0.500]	0.354 (0.284) [0, 9.330]
Tetrachloroethylene	µg/L	0.460 (0.584) [0, 8.000]	0.397 (0.376) [0, 5.110]	0.407 (0.771) [0, 23.750]	0.325 (0.300) [0, 4.330]	0.407 (0.595) [0, 23.750]
Monochlorobenzene (Chlorobenzene)	µg/L	0.353 (0.273) [0, 4.130]	0.345 (0.240) [0, 1.440]	0.357 (0.225) [0, 1.190]	0.299 (0.238) [0, 0.750]	0.342 (0.248) [0, 4.130]
Benzene	µg/L	0.382 (0.324) [0, 4.130]	0.3888 (0.342) [0, 3.480]	0.378 (0.249) [0, 3.130]	0.321 (0.259) [0, 2.200]	0.368 (0.290) [0, 4.130]
Toluene	µg/L	0.721 (6.435) [0, 200.550]	2.404 (22.078) [0, 333.670]	0.640 (6.240) [0, 200.380]	0.896 (13.580) [0, 350.250]	0.904 (10.816) [0, 350.250]
Ethylbenzene	µg/L	0.394 (0.355) [0, 3.900]	0.426 (0.666) [0, 9.150]	0.393 (0.364) [0, 4.550]	0.303 (0.246) [0, 1.100]	0.377 (0.385) [0, 9.150]
Styrene	µg/L	0.479 (2.455) [0, 78.540]	0.384 (0.343) [0, 3.480]	0.387 (0.310) [0, 4.900]	0.320 (0.246) [0, 1.100]	0.404 (1.467) [0, 78.540]
cis-1,2-Dichloroethylene	µg/L	0.370 (0.426) [0, 11.880]	0.379 (0.363) [0, 11.390]	0.367 (0.225) [0, 1.200]	0.315 (0.252) [0, 2.070]	0.358 (0.328) [0, 11.880]
Alpha particles	pCi/L	1.034 (2.333) [0, 35.800]	1.113 (1.851) [0, 11.390]	1.364 (3.517) [0, 51.450]	0.781 (2.053) [0, 18.100]	1.099 (2.711) [0, 51.450]

NOTE: Calculated with nontransformed data



### Land Domain

In the land domain, the metropolitan-urbanized counties had higher averages of soil contaminants, more facilities, and lower agricultural-related variables (percent harvested and percent irrigated) than did nonmetropolitan-urbanized, less urban, and thinly populated counties (Table 5). Pesticides

and animal units showed no clear pattern in variation across the strata. For example, average pounds of herbicides applied were 68,500, 108,000, 95,600, and 68,100 for most urban to most rural strata, respectively. There was little variation in the distribution of radon zones or agricultural chemicals applied across the urban/rural strata.

**Table 5. Land Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

		Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
Variable	Units	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Land Domain						
Construct: Agriculture						
Harvested acreage	Acres harvested per county acres	0.183 (0.208) [0, 0.920]	0.240 (0.244) [0, 0.895]	0.240 (0.253) [0, 1.221]	0.201 (0.218) [0, 0.946]	0.212 (0.231) [0, 1.221]
Irrigated acreage	Acres irrigated per county acres	0.062 (0.111) [0, 0.863]	0.094 (0.165) [0, 0.879]	0.105 (0.175) [0, 1.017]	0.111 (0.181) [0, 0.940]	0.090 (0.158) [0, 1.017]
Farms per acre	Number of farms per county acres	2.04E-04 (3.52E-04) [0, 5.04E-03]	1.52E-04 (2.01E-04) [0, 1.24E-03]	1.26E-04 (2.03E-04) [0, 2.06E-03]	8.37E-05 (1.39E-04) [0, 1.30E-03]	1.47E-04 (2.59E-04) [0, 5.04E-03]
Manure	Acres applied per county acres	0.016 (0.024) [0, 0.269]	0.021 (0.029) [0, 0.176]	0.019 (0.027) [0, 0.231]	0.011 (0.019) [0, 0.169]	0.016 (0.025) [0, 0.269]
Chemicals used to control nematodes	Acres applied per county acres	0.004 (0.010) [0, 0.111]	0.005 (0.012) [0, 0.080]	0.005 (0.012) [0, 0.104]	0.003 (0.009) [0, 0.132]	0.004 (0.011) [0, 0.132]
Chemicals used to control disease	Acres applied per county acres	0.008 (0.019) [0, 0.195]	0.008 (0.022) [0, 0.235]	0.006 (0.016) [0, 0.217]	0.005 (0.015) [0, 0.198]	0.007 (0.018) [0, 0.235]
Chemicals used to defoliate/control growth/thin fruit	Acres applied per county acres	0.006 (0.020) [0, 0.213]	0.010 (0.035) [0, 0.336]	0.009 (0.029) [0, 0.311]	0.005 (0.022) [0, 0.429]	0.007 (0.025) [0, 0.429]
Animal units	Animal units per county acres	0.151 (0.727) [0, 20.984]	0.079 (0.116) [0, 1.235]	0.174 (1.639) [0, 46.941]	0.103 (0.143) [0, 1.481]	0.141 (1.047) [0, 46.941]
Construct: Pesticides						
Herbicides	Pounds applied	6.85E+04 (1.28E+05) [0, 1.18E+06]	1.08E+05 (1.66E+05) [0, 1.08E+06]	9.56E+04 (1.52E+05) [0, 1.15E+06]	6.81E+04 (1.08E+05) [0, 7.16E+05]	8.16E+04 (1.38E+05) [0, 1.18E+06]
Fungicides	Pounds applied	1.82E+03 (1.50E+04) [0, 3.55E+05]	4.03E+03 (2.88E+04) [0, 3.91E+05]	2.74E+03 (2.35E+04) [0, 5.21E+05]	2.14E+03 (1.40E+04) [0, 2.67E+05]	2.43E+03 (1.98E+04) [0, 5.21E+05]
Insecticides	Pounds applied	3.69E+03 (8.89E+03) [0, 1.72E+05]	6.14E+03 (1.36E+04) [0, 1.89E+05]	5.11E+03 (1.05E+04) [0, 1.53E+05]	2.75E+03 (5.33E+03) [0, 4.87E+04]	4.22E+03 (9.52E+03) [0, 1.89E+05]
Construct: Contaminants						
Arsenic	ppm	6.530 (5.445) [0, 91.333]	6.850 (8.171) [0, 131.369]	6.435 (5.139) [0, 98.893]	6.342 (4.304) [0, 43.595]	6.491 (5.476) [0, 131.369]
Selenium	ppm	0.316 (0.240) [0, 5.095]	0.314 (0.196) [0, 1.306]	0.336 (0.253) [0, 2.981]	0.359 (0.321) [0, 5.322]	0.332 (0.260) [0, 5.322]
Mercury	ppm	0.093 (0.281) [0, 5.438]	0.046 (0.085) [0, 1.052]	0.042 (0.077) [0, 1.159]	0.041 (0.100) [0, 1.648]	0.060 (0.181) [0, 5.438]
Lead	ppm	29.901 (45.950) [0, 1007.300]	22.049 (17.221) [0, 196.867]	21.219 (24.976) [0, 691.838]	22.812 (51.740) [0, 1123.110]	24.654 (39.465) [0, 1123.110]



**Table 5. (continued) Land Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

Variable	Units	Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
		Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Zinc	ppm	63.139 (47.279) [0, 560.912]	57.856 (33.804) [0, 365.070]	53.581 (34.096) [0, 432.142]	59.663 (70.332) [0, 1500.990]	58.631 (48.511) [0, 1500.990]
Copper	ppm	14.753 (10.938) [0, 105.580]	14.592 (11.736) [0, 96.644]	13.211 (10.985) [0, 180.806]	14.423 (20.393) [0, 436.832]	14.146 (13.613) [0, 436.832]
Sodium	% weight	0.606 (0.500) [0, 2.473]	0.650 (0.465) [0, 2.198]	0.589 (0.459) [0, 2.412]	0.679 (0.439) [0, 2.192]	0.620 (0.471) [0, 2.473]
Magnesium	% weight	0.603 (0.574) [0, 4.554]	0.631 (0.579) [0, 4.091]	0.556 (0.510) [0, 4.995]	0.613 (0.465) [0, 3.624]	0.592 (0.532) [0, 4.995]
Titanium	% weight	0.404 (0.228) [0, 2.118]	0.369 (0.185) [0, 1.405]	0.327 (0.165) [0, 2.109]	0.318 (0.185) [0, 1.941]	0.356 (0.198) [0, 2.118]
Calcium	% weight	1.744 (2.321) [0, 22.244]	1.623 (1.849) [0, 15.590]	1.597 (1.936) [0, 17.371]	1.758 (1.872) [0, 18.709]	1.685 (2.057) [0, 22.244]
Iron	% weight	2.531 (1.480) [0, 13.731]	2.372 (1.282) [0, 8.440]	2.152 (1.186) [0, 9.461]	2.154 (1.054) [0, 7.165]	2.307 (1.292) [0, 13.731]
Aluminum	% weight	4.041 (1.812) [0, 9.409]	4.199 (1.871) [0, 9.171]	3.943 (1.814) [0, 9.914]	4.256 (1.778) [0, 9.506]	4.070 (1.815) [0, 9.914]
Phosphorus	% weight	0.067 (0.139) [0, 2.203]	0.056 (0.095) [0, 1.296]	0.051 (0.059) [0, 1.025]	0.053 (0.040) [0, 0.509]	0.057 (0.096) [0, 2.203]
Construct: Facilities						
Facilities	Facilities per county population	3.94E-04 (2.77E-04) [0, 2.30E-03]	4.95E-04 (3.08E-04) [4.23E-05, 2.19E-03]	5.59E-04 (4.60E-04) [0, 7.55E-03]	7.77E-04 (2.33E-03) [0, 5.42E-02]	5.42E-04 (1.13E-03) [0, 5.42E-02]
Construct: Radon						
Radon zone	Radon zone	2.010 (0.815) [0, 3.000]	2.000 (0.856) [0, 3.000]	2.022 (0.834) [0, 3.000]	1.849 (0.809) [0, 3.000]	1.979 (0.827) [0, 3.000]

NOTE: Calculated with nontransformed data

### Sociodemographic Domain

Socioeconomic variables included in the sociodemographic domain indicated that rural counties generally were more deprived than were more urban counties (Table 6), with both the lowest household income (\$30,300) and highest percent of persons in poverty (16.1%). From the crime perspective, however, rural areas were at an advantage compared with more urban areas; the mean violent crime rate for rural counties was 352.5 compared with 390.9 for the most urban and 397.1 for the nonmetropolitan-urbanized counties.

### Built Environment Domain

The most rural counties had the smallest proportion of highways and a significantly higher rate of traffic fatalities compared with more urban areas (Table 7). Urban counties also had fewer education-related businesses, positive food establishments, recreation-related resources, and subsidized housing units compared with more rural counties.

**Table 6. Sociodemographic Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

		Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
Variable	Units	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Sociodemographic Domain						
Construct: Socioeconomic						
Percent renter occupied	%	27.734 (9.557) [10.561, 80.458]	29.307 (6.499) [13.562, 52.731]	25.338 (5.588) [13.545, 72.205]	22.947 (6.814) [10.464, 100]	26.067 (7.791) [10.464, 100]
Percent vacant units	%	9.146 (5.810) [1.539, 53.707]	12.026 (7.190) [3.457, 58.416]	15.324 (8.392) [4.336, 62.316]	21.980 (11.880) [4.183, 77.014]	14.263 (9.668) [1.539, 77.014]
Median household value	Dollar value	1.10E+05 (5.51E+04) [3.46E+04, 1.00E+06]	8.86E+04 (3.48E+04) [3.78E+04, 3.69E+05]	7.25E+04 (3.90E+04) [2.26E+04, 7.50E+05]	6.09E+04 (3.06E+04) [0, 3.58E+05]	8.46E+04 (4.77E+04) [0, 1.00E+06]
Median household income	Dollar value	4.17E+04 (9.84E+03) [1.98E+04, 8.29E+04]	3.53E+04 (6.39E+03) [1.65E+04, 6.27E+04]	3.21E+04 (6.03E+03) [1.63E+04, 7.90E+04]	3.03E+04 (5.59E+03) [9.33E+03, 5.37E+04]	3.54E+04 (8.92E+03) [9.33E+03, 8.29E+04]
Percent persons less than poverty level	%	11.567 (5.307) [2.100, 35.900]	14.187 (6.275) [4.500, 50.900]	15.601 (6.565) [2.900, 52.300]	16.147 (7.107) [0, 56.900]	14.173 (6.554) [0, 56.900]
Percent no English	%	9.490 (10.534) [1.000, 91.900]	9.257 (12.094) [1.900, 92.100]	8.451 (12.103) [0.700, 84.800]	6.791 (9.492) [0.400, 85.400]	8.540 (11.092) [0.400, 92.100]
Percent greater than high school education	%	80.181 (7.546) [50.500, 97.000]	78.708 (7.814) [34.700, 93.800]	74.877 (8.813) [43.400, 96.300]	76.139 (9.478) [39.500, 94.400]	77.379 (8.755) [34.700, 97.000]
Percent unemployed	%	5.293 (2.301) [1.700, 41.700]	6.433 (2.468) [2.500, 20.900]	6.298 (2.757) [1.400, 33.000]	5.631 (3.745) [0, 41.400]	5.821 (2.868) [0, 41.700]
Percent work outside county	%	40.137 (20.673) [1.100, 90.800]	21.479 (12.061) [1.300, 60.800]	28.042 (13.447) [0.600, 77.200]	32.952 (16.543) [0, 76.400]	32.608 (17.936) [0, 90.800]
Median number rooms per house	Count	5.522 (0.459) [3.100, 7.300]	5.372 (0.345) [4.000, 6.600]	5.361 (0.360) [3.300, 6.400]	5.368 (0.485) [2.000, 6.500]	5.420 (0.430) [2.000, 7.300]
Percent of housing with more than 10 units	%	6.856 (7.239) [0, 90.100]	4.845 (3.542) [0.600, 35.100]	2.689 (2.717) [0, 42.100]	1.475 (2.146) [0, 31.400]	4.096 (5.268) [0, 90.100]
Construct: Crime						
Mean number of violent crimes per capita	Crime rate	390.884 (322.135) [0, 2481.800]	397.099 (374.610) [0, 1955.500]	366.303 (233.612) [0, 1897.300]	352.528 (158.067) [0, 783.402]	375.054 (272.635) [0, 2481.800]

NOTE: Calculated with nontransformed data

**Table 7. Built-Environment Domain Variable Means, Standard Deviations (SDs), and Ranges—Overall and Rural-Urban Continuum Codes (RUCCs) Stratified**

		Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
Variable	Units	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]	Mean (SD) [Range]
Built-Environment Domain						
Construct: Roads						
Proportion of roads that are highway	Mile proportion	0.045 (0.026) [0, 0.156]	0.045 (0.025) [0, 0.158]	0.039 (0.029) [0, 0.210]	0.029 (0.031) [0, 0.291]	0.039 (0.029) [0, 0.291]
Proportion of roads that are primary streets	Mile proportion	0.171 (0.059) [0.009, 0.536]	0.148 (0.067) [0.015, 0.438]	0.136 (0.063) [0, 0.406]	0.119 (0.063) [0, 0.371]	0.146 (0.065) [0, 0.536]
Construct: Highway/Road Safety						
Traffic fatality rate	Fatality count per county population	4.72E-04 (3.92E-04) [0, 5.04E-03]	5.14E-04 (2.63E-04) [0, 1.60E-03]	6.94E-04 (5.48E-04) [0, 6.29E-03]	9.45E-04 (1.33E-03) [0, 1.10E-02]	6.52E-04 (7.57E-04) [0, 1.10E-02]
Construct: Public Transit Behavior						
Percent of population using public transport	%	1.699 (4.542) [0, 59.600]	0.714 (1.033) [0, 8.800]	0.447 (0.780) [0, 10.600]	0.393 (0.603) [0, 6.900]	0.897 (2.809) [0, 59.600]
Construct: Business Environment						
Vice-related businesses	Count/county population	3.56E-04 (2.10E-04) [1.66E-05, 1.96E-03]	4.48E-04 (2.29E-04) [3.05E-05, 1.39E-03]	4.71E-04 (3.32E-04) [2.47E-05, 2.06E-03]	7.25E-04 (6.56E-04) [3.71E-05, 4.66E-03]	4.76E-04 (3.98E-04) [1.66E-05, 4.66E-03]
Entertainment-related businesses	Count/county population	4.06E-04 (2.40E-04) [3.80E-05, 2.51E-03]	4.43E-04 (2.26E-04) [6.72E-05, 1.63E-03]	3.99E-04 (2.98E-04) [2.82E-05, 2.97E-03]	5.24E-04 (6.01E-04) [5.15E-05, 6.80E-03]	4.28E-04 (3.51E-04) [2.82E-05, 6.80E-03]
Education-related businesses	Count/county population	5.80E-04 (3.19E-04) [7.30E-05, 3.25E-03]	6.09E-04 (3.98E-04) [1.01E-04, 3.33E-03]	6.11E-04 (4.37E-04) [4.73E-05, 3.92E-03]	6.06E-04 (4.50E-04) [6.10E-05, 3.26E-03]	5.99E-04 (3.97E-04) [4.73E-05, 3.92E-03]
Negative food-related businesses	Count/county population	7.67E-04 (2.15E-04) [9.44E-05, 2.26E-03]	8.67E-04 (2.12E-04) [2.01E-04, 1.82E-03]	8.85E-04 (2.89E-04) [1.35E-04, 2.82E-03]	8.27E-04 (5.03E-04) [6.18E-05, 5.38E-03]	8.30E-04 (3.20E-04) [6.18E-05, 5.38E-03]
Positive food-related businesses	Count/county population	1.70E-04 (5.98E-04) [3.88E-04, 1.04E-02]	1.84E-03 (4.70E-04) [6.28E-04, 4.63E-03]	1.85E-03 (6.51E-04) [3.82E-04, 7.87E-03]	1.98E-03 (1.11E-03) [1.92E-04, 1.49E-02]	1.82E-03 (7.50E-04) [1.92E-04, 1.49E-02]
Health-care-related businesses	Count/county population	2.69E-03 (1.39E-03) [1.94E-04, 2.47E-02]	2.96E-03 (8.53E-04) [7.79E-04, 8.89E-03]	2.56E-03 (9.80E-04) [1.42E-04, 1.13E-02]	2.15E-03 (1.03E-03) [1.42E-04, 7.66E-03]	2.56E-03 (1.16E-03) [1.42E-04, 2.47E-02]
Recreation-related businesses	Count/county population	2.49E-04 (1.24E-04) [3.38E-05, 1.16E-03]	3.11E-04 (1.47E-04) [2.91E-05, 1.13E-03]	3.32E-04 (2.41E-04) [3.03E-05, 2.00E-03]	5.13E-04 (6.47E-04) [5.57E-05, 1.08E-02]	3.30E-04 (3.29E-04) [2.91E-05, 1.08E-02]
Transportation-related businesses	Count/county population	1.15E-04 (7.92E-05) [1.16E-05, 1.25E-03]	1.14E-04 (5.67E-05) [2.17E-05, 3.60E-04]	1.27E-04 (1.09E-04) [2.39E-05, 1.79E-03]	2.29E-04 (3.60E-04) [2.97E-05, 4.95E-03]	1.31E-04 (1.47E-04) [1.16E-05, 4.95E-03]
Social-service-related businesses	Count/county population	8.64E-05 (5.72E-05) [9.77E-06, 7.06E-04]	9.18E-05 (5.12E-05) [6.79E-06, 2.76E-04]	1.17E-04 (8.79E-05) [1.44E-05, 8.37E-04]	2.03E-04 (1.54E-04) [2.97E-05, 1.06E-03]	1.10E-04 (9.03E-05) [6.79E-06, 1.06E-03]
Construct: Subsidized Housing Environment						
Total subsidized units	Count/county population	1.11E-02 (2.91E-02) [0, 6.46E-01]	1.27E-02 (1.82E-02) [0, 1.77E-01]	0.010 (0.019) [0, 0.416]	0.009 (0.042) [0, 0.834]	1.03E-02 (2.86E-02) [0, 8.34E-01]

NOTE: Calculated with nontransformed data

## Variable Loadings on EQI Domains

### Air Domain

The loadings for the variables that comprise the air domain varied by RUCC stratum, although not extensively (Table 8).

Direction of loadings was similar across the urban/rural

strata. Criteria air pollutants were less influential in the metropolitan-urbanized stratum compared with the other strata, whereas influence of HAPs varied.

**Table 8. Variable Loadings—Air Domain**

Air Domain	Metropolitan-Urbanized (RUCC1 = 1089)	Nonmetropolitan-Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL(n=3141)
Construct: Criteria Air Pollutants					
Nitrogen dioxide	0.0613	0.1091	0.1014	0.0911	0.0848
Carbon monoxide	0.0308	0.0938	0.0754	0.0913	0.0738
Sulfur dioxide	0.0436	0.1227	0.1121	0.1053	0.0822
Ozone	0.048	0.1232	0.0982	0.0751	0.0711
PM <sub>10</sub>	0.0845	0.0677	0.0627	0.0937	0.0897
PM <sub>2.5</sub>	0.0701	0.1513	0.1281	0.1354	0.1036
Construct: Hazardous Air Pollutants					
1,1,2,2-Tetrachloroethane	0.1525	0.1087	0.1157	0.0644	0.1236
1,1,2-Trichloroethane	0.0765	0.0879	0.0945	0.1145	0.1045
1,2-Dibromo-3-chloropropane	0.0113	0.0352	0.0212	0.0508	0.0332
2,4-Toluene diisocyanate	0.1131	0.111	0.1307	0.1301	0.128
2-Chloroacetophenone	0.0317	0.0932	0.082	0.0829	0.076
2-Nitropropane	0.0738	0.1075	0.099	0.1018	0.0929
4-Nitrophenol	0.1628	0.1219	0.1214	0.1117	0.1309
Acetonitrile	0.0934	0.0977	0.0737	0.0834	0.0972
Acetophenone	0.1229	0.0914	0.1206	0.1234	0.1265
Acrolein	0.1371	0.0684	0.0762	0.0932	0.1164
Acrylic acid	0.0964	0.1305	0.124	0.1261	0.1208
Acrylonitrile	0.0778	0.1022	0.1112	0.1158	0.0963
Antimony compounds	0.1032	0.1149	0.1126	0.1146	0.1153
Benzidine	-0.0232	0.0186	0.002	0.0231	0.0051
Benzyl chloride	0.0952	0.1275	0.1191	0.1183	0.12
Beryllium compounds	0.0916	0.1123	0.0664	0.0745	0.0857
Biphenyl	0.1251	0.1024	0.1219	0.1327	0.1264
bis-2-Ethylhexyl phthalate	0.0392	0.0516	0.0366	0.0904	0.0373
Bromoform	0.0464	0.0975	0.082	0.0825	0.0808
Cadmium compounds	0.1072	0.0776	0.0676	0.0764	0.0905
Carbon disulfide	0.1169	0.114	0.1172	0.1261	0.1242
Carbon tetrachloride	0.0259	0.0281	0.0186	-0.0028	0.018
Carbon sulfide	0.0731	0.0469	0.0494	0.0757	0.0829
Chlorine	0.082	0.0977	0.1054	0.1174	0.1066
Chlorobenzene	0.1093	0.0594	0.0982	0.1065	0.1076
Chloroform	0.1274	0.0897	0.0655	0.0797	0.0985
Chloroprene	0.1189	0.1366	0.1302	0.124	0.1259
Chromium compounds	0.1344	0.0986	0.0893	0.0875	0.1098
Cresol/cresylic acid	0.1267	0.1033	0.1147	0.1251	0.1248
Cumene	0.1506	0.1179	0.1476	0.1446	0.1414
Cyanide compounds	0.1655	0.1674	0.168	0.1497	0.1477
Dibutylphthalate	0.098	0.0859	0.1055	0.1251	0.1163
Diesel engine emissions	0.1545	0.1441	0.1431	0.1163	0.1321
Dimethyl formamide	0.1548	0.132	0.1443	0.1418	0.1404



**Table 8. (continued) Variable Loadings—Air Domain**

Air Domain	Metropolitan-Urbanized (RUCC1 = 1089)	Nonmetropolitan-Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL(n=3141)
Dimethyl phthalates	0.0968	0.0962	0.1105	0.1254	0.1183
Dimethyl sulfate	0.0472	0.1201	0.1024	0.1072	0.0942
Epichlorohydrin	0.0867	0.1248	0.1004	0.0995	0.0986
Ethyl acrylate	0.1008	0.1341	0.1251	0.1206	0.1175
Ethyl chloride	0.1032	0.0788	0.0971	0.1192	0.1132
Ethylene dibromide	0.1534	0.1185	0.123	0.1212	0.1272
Ethylene dichloride	0.1525	0.1214	0.1385	0.108	0.133
Ethylene glycol	0.1628	0.1427	0.1604	0.15	0.1464
Ethylene oxide	0.1106	0.1225	0.1218	0.1226	0.117
Ethylidene dichloride	0.0807	0.0212	0.0476	0.0796	0.0874
Glycol ethers	0.1338	0.1229	0.1234	0.0979	0.1228
Hexachlorobenzene	0.0276	0.1141	0.1396	0.1365	0.0991
Hexachlorobutadiene	0.0701	0.1053	0.0866	0.0874	0.0764
Hexachlorocyclopentadiene	0.0612	0.1013	0.0819	0.0792	0.0704
Hexane	0.1556	0.1247	0.144	0.1418	0.1412
Hydrazine	0.0619	0.0916	0.0707	0.0781	0.0644
Hydrochloric acid	0.0901	0.1209	0.1242	0.1347	0.1231
Isophorone	0.0537	0.0832	0.0694	0.0696	0.0676
Lead compounds	0.1366	0.0778	0.069	0.0581	0.1045
Manganese compounds	0.0791	0.0771	0.0724	0.0786	0.0759
Mercury compounds	0.083	0.0611	0.0336	0.0491	0.0605
Methanol	0.1559	0.1421	0.1545	0.1457	0.1434
Methyl isobutyl ketone	0.1556	0.157	0.155	0.144	0.1424
Methyl methacrylate	0.1229	0.1079	0.1222	0.1275	0.1277
Methyl chloride	0.0883	0.0287	0.0174	0.0073	0.0562
Methylhydrazine	0.0272	0.0613	0.0469	0.049	0.0527
Methyl tert-butyl ether	0.1226	0.0937	0.1376	0.1397	0.1313
Nitrobenzene	0.0751	0.1147	0.0954	0.091	0.0868
N,N-dimethylaniline	0.0655	0.1157	0.1003	0.0955	0.0877
o-toluidine	0.1203	0.1279	0.1289	0.1257	0.1255
Polycyclic aromatic hydrocarbon compounds/polycyclic organic matter	0.1143	0.0822	0.1172	0.1192	0.1199
Pentachlorophenol	0.002	0.1202	0.0899	0.087	0.0485
Phosphine	-0.0272	0.0129	0.0145	0.0066	-0.0015
Phosphorus	0.0174	-0.0073	-0.0022	0.0173	0.012
Polychlorinated biphenyls	0.0284	0.13	0.0954	0.0779	0.0729
Propylene dichloride	0.1524	0.1202	0.132	0.0882	0.1302
Propylene oxide	0.1471	0.1537	0.1415	0.1417	0.1395
Quinoline	0.064	0.1238	0.1092	0.1088	0.0848
Selenium compounds	0.1198	0.1102	0.1268	0.1245	0.127
Styrene	0.1375	0.1309	0.1358	0.1372	0.1334
Tetrachloroethylene	0.1433	0.0865	0.0852	0.0788	0.1115
Toluene	0.1673	0.1541	0.1313	0.1298	0.1404
Trichloroethylene	0.1147	0.1441	0.1327	0.1279	0.1163
Triethylamine	0.1281	0.1066	0.1349	0.1391	0.1332
Vinyl acetate	0.125	0.1005	0.1249	0.1353	0.1308
Vinyl chloride	0.1489	0.0997	0.1008	0.097	0.1257
Vinylidene chloride	0.1464	0.1121	0.1172	0.124	0.1314

### Water Domain

The loadings for the variables that comprise the water domain varied by RUCC and also by construct, suggesting that some constructs were more influential in urban areas and others in rural areas (Table 9). Variables representing overall water quality loaded positively in the two urban RUCC strata and negatively in the rural RUCC stratum. The loadings for variables representing general water contamination and

recreational water quality varied by RUCC, although they were, overall, quite low. Loadings for variables representing domestic water quality and drought varied by RUCC, although they were all positive. The loadings for variables representing the atmospheric deposition construct varied by RUCC and did not demonstrate any clear patterns. Variables in the chemical contamination construct demonstrated little variability by RUCC, with loadings of similar values for all variables across all RUCCs.

**Table 9. Variable Loadings—Water Domain**

Water Domain	Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
Construct: Overall Water Quality					
Percent of stream length impaired in county	0.0078	0.0063	-0.0067	-0.0172	0.0031
Construct: General Water Contamination					
Sewage permits	0.0004	0.0017	0.009	0.0104	0.0059
Industrial permits	-0.0214	-0.0394	-0.0078	0.0084	-0.0114
Stormwater permits	-0.0353	-0.0243	-0.0158	0.021	-0.0209
Construct: Recreational Water Quality					
Number of days of beach closure	-0.0019	-0.0072	0.0085	0.0092	0
Number of days beach closure for contamination advisory events	0.0035	-0.0067	0.0015	0.0075	0.0019
Number of days beach closure for rain advisory events	0.014	0.0009	0.0051	0.001	0.0091
Construct: Domestic Use					
Percent of population on self supply	0.0068	0.0166	0.0349	0.0185	0.0139
Percent of public supply population on surface water	0.019	0.0175	0.0098	0.0346	0.022
Construct: Atmospheric Deposition					
Calcium precipitation weighted mean	0.0325	0.0179	0.0231	-0.0055	0.0154
Magnesium precipitation weighted mean	0.0028	0.0064	-0.0074	-0.0241	-0.0089
Potassium precipitation weighted mean	-0.0066	-0.0043	-0.0131	-0.0253	-0.0163
Sodium precipitation weighted mean	-0.0358	-0.0229	-0.0375	-0.0133	-0.0262
Ammonium precipitation weighted mean	0.044	0.0211	0.0123	-0.025	0.0076
Nitrate precipitation weighted mean	0.0262	0.0034	0.0167	-0.0002	0.0144
Chloride precipitation weighted mean	-0.0392	-0.0303	-0.0408	-0.0065	-0.0259
Sulfate precipitation weighted mean	0.0002	-0.0144	0.0015	0.0167	0.0051
Total mercury deposition	-0.0413	-0.0359	-0.0293	0.0072	-0.0228
Construct: Drought					
Percent of county drought—extreme (D3-D4)	0.0035	0.0337	0.0234	0.0242	0.0164
Construct: Chemical Contamination					
Arsenic	0.119	0.1187	0.1043	0.0996	0.1112
Barium	0.1265	0.1297	0.1173	0.1199	0.1234
Cadmium	0.1045	0.1019	0.0967	0.1085	0.1036
Chromium	0.1147	0.1183	0.102	0.1069	0.1103
Cyanide	0.085	0.0965	0.0749	0.0797	0.0825
Fluoride	0.1234	0.1277	0.1175	0.116	0.1209
Mercury (inorganic)	0.0905	0.0899	0.0763	0.091	0.0868
Nitrate	0.1159	0.1133	0.0883	0.0867	0.1016
Nitrite	0.0985	0.0937	0.0816	0.0822	0.0902
Selenium	0.1123	0.1196	0.1044	0.1071	0.1103
Antimony	0.1086	0.1027	0.0972	0.1038	0.1041
Beryllium	0.107	0.1126	0.0859	0.1105	0.1005
Thallium	0.1099	0.1117	0.1059	0.1077	0.1091

**Table 9. (continued) Variable Loadings—Water Domain**

Water Domain	Metropolitan- Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
Endrin	0.1188	0.1195	0.1205	0.1249	0.121
Lindane	0.1265	0.1297	0.1173	0.1199	0.1234
Methoxychlor	0.1282	0.1282	0.1313	0.1351	0.131
Toxaphene	0.1212	0.1232	0.1177	0.1191	0.1203
Dalapon	0.1161	0.1121	0.112	0.1165	0.1148
di(2-ethylhexyl) adipate	0.1241	0.1204	0.1227	0.122	0.1234
Oxamyl (Vydate)	0.1215	0.1186	0.1189	0.122	0.1209
Simazine	0.134	0.1356	0.1348	0.1369	0.1354
di(2-ethylhexyl) phthalate	0.1202	0.1163	0.1171	0.116	0.1187
Picloram	0.1165	0.1111	0.1134	0.1189	0.1156
Dinoseb	0.1235	0.1223	0.1211	0.1264	0.1235
Hexachlorocyclopentadiene	0.1305	0.1335	0.1349	0.1356	0.1336
Carbofuran	0.1209	0.1185	0.1184	0.122	0.1206
Atrazine	0.1356	0.1362	0.1348	0.138	0.1362
Alachlor	0.1373	0.1403	0.1384	0.1393	0.1387
Heptachlor	0.1306	0.1325	0.1341	0.1356	0.1332
Heptachlor Epoxide	0.1305	0.1336	0.1335	0.1349	0.133
2,4-Dichlorophenoxyacetic acid	0.1243	0.1244	0.121	0.1265	0.1241
Silvex	0.1217	0.1209	0.1204	0.127	0.1226
Hexachlorobenzene	0.1309	0.1323	0.1345	0.1358	0.1335
Benzo[a]pyrene	0.1217	0.119	0.1198	0.1191	0.1207
Pentachlorophenol	0.1286	0.1268	0.1314	0.1338	0.1305
1,2,4-Trichlorobenzene	0.1445	0.1445	0.1507	0.1455	0.1467
Polychlorinated biphenyls	0.0966	0.0857	0.0857	0.0922	0.0918
1,2-Dibromo-3-chloropropane	0.1199	0.1142	0.1221	0.1219	0.1206
Ethylene dibromide	0.0899	0.0975	0.0996	0.098	0.0952
Xylenes	0.1343	0.1313	0.1466	0.1446	0.1402
Chlordane	0.1314	0.1344	0.1343	0.1346	0.1336
Dichloromethane (Methylene chloride)	0.1434	0.1446	0.1499	0.1451	0.1461
1,2-Dichlorobenzene (o-Dichlorobenzene)	0.144	0.1443	0.1497	0.1459	0.1463
1,4-Dichlorobenzene (p-Dichlorobenzene)	0.1391	0.1401	0.1377	0.1392	0.139
Vinyl chloride	0.1447	0.1448	0.1502	0.1457	0.1467
1,1-Dichloroethylene	0.1439	0.1449	0.1505	0.1461	0.1467
trans-1,2-Dichloroethylene	0.1435	0.1412	0.1489	0.1454	0.1455
1,2-Dichloroethane (Ethylene dichloride)	0.1445	0.1445	0.1507	0.1455	0.1467
1,1,1-Trichloroethane	0.1441	0.1437	0.1498	0.1457	0.1464
Carbon tetrachloride	0.145	0.1441	0.1509	0.1462	0.1471
1,2-Dichloropropane	0.1451	0.1452	0.1512	0.1461	0.1473
Trichloroethylene	0.1426	0.1446	0.1492	0.1454	0.1457
1,1,2-Trichloroethane	0.1451	0.145	0.1511	0.1462	0.1472
Tetrachloroethylene	0.1442	0.1438	0.1495	0.1458	0.1463
Monochlorobenzene(Chlorobenzene)	0.1441	0.1421	0.1503	0.1459	0.1463
Benzene	0.145	0.1439	0.1511	0.1458	0.1471
Toluene	0.1439	0.1424	0.1505	0.1447	0.1462
Ethylbenzene	0.144	0.1431	0.1494	0.1453	0.1461
Styrene	0.1443	0.1451	0.151	0.146	0.147
cis-1,2-Dichloroethylene	0.1445	0.1445	0.1507	0.1455	0.1467
Alpha particles	0.062	0.0794	0.0703	0.0704	0.0691

### Land Domain

The loadings for variables in the land domain varied considerably (Table 10). For mercury, lead, and titanium, loading magnitudes were much lower in the most urban stratum, whereas the loadings across all other strata were

comparable. Some variables had the highest loading in the most urban and most rural strata (e.g., herbicides), whereas others remained stable across strata (e.g., arsenic, iron, harvested acreage). Direction of loadings was consistent across strata.

**Table 10. Variable Loadings—Land Domain**

Land Domain	Metropolitan-Urbanized (RUCC1 = 1089)	Nonmetropolitan- Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
Construct: Agriculture					
Harvested acreage	0.1572	0.1395	0.1398	0.1373	0.14
Irrigated acreage	0.0876	0.0318	0.064	0.0954	0.0773
Farms per acre	0.1182	0.0304	0.0738	0.1138	0.0965
Manure	0.1546	0.1141	0.1053	0.137	0.1265
Chemicals used to control nematodes	0.0626	0.033	0.0272	0.0416	0.0435
Chemicals used to control disease	0.0819	0.0074	0.0336	0.0592	0.0547
Chemicals used to defoliate/ control growth/thin fruit	0.0316	-0.0219	-0.0162	0.0351	0.0127
Animal units	-0.0358	-0.0133	0.0019	0.0202	-0.0034
Construct: Pesticides					
Herbicides	0.1701	0.1393	0.135	0.1762	0.1524
Fungicides	0.1447	0.1026	0.0657	0.0956	0.1005
Insecticides	0.1407	0.1049	0.0874	0.1047	0.1072
Construct: Contaminants					
Arsenic	0.2617	0.2774	0.2722	0.2626	0.2685
Selenium	0.2186	0.2267	0.2339	0.2428	0.2338
Mercury	0.1264	0.1763	0.1863	0.1883	0.1682
Lead	0.1731	0.23	0.2395	0.2386	0.2228
Zinc	0.3142	0.3242	0.3199	0.2976	0.3186
Copper	0.3032	0.2879	0.3062	0.2897	0.3043
Sodium	0.2934	0.2985	0.2906	0.278	0.2916
Magnesium	0.3195	0.31	0.3037	0.2915	0.3085
Titanium	0.1012	0.1965	0.1701	0.202	0.1682
Calcium	0.2624	0.2577	0.2656	0.2686	0.2677
Iron	0.3099	0.3218	0.3139	0.2948	0.3144
Aluminum	0.2795	0.2695	0.2746	0.2544	0.2712
Phosphorus	0.1011	0.0858	0.1428	0.1775	0.1053
Construct: Facilities					
Facilities	0.1169	0.1164	0.0604	0.0732	0.0779
Construct: Radon					
Radon zone	-0.1703	-0.1877	-0.1909	-0.1606	-0.1753



### Sociodemographic Domain

The loadings for the variables that comprise the sociodemographic domain varied by RUCC (Table 11), indicating some variables were more influential on the domain score in urban counties, whereas others exerted more of an effect in rural counties. The patterns of association within the socioeconomic construct were fairly consistent, meaning the variables that loaded negatively in the urban counties also loaded negatively in the least urban counties. For instance, renter occupation and vacant units were

associated negatively with median household value and median household income across rural-urban status. The one socioeconomic variable for which this was not the case was for the percentage of persons who worked outside the county. For this variable, working outside the county in less urbanized and thinly populated strata was associated inversely with more than a high school education but was associated positively in metropolitan-urbanized and nonmetropolitan-urbanized counties.

**Table 11. Variable Loadings—Sociodemographic Domain**

Sociodemographic Domain	Metropolitan-Urbanized (RUCC1 = 1089)	Nonmetropolitan-Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
<b>Socioeconomic Construct</b>					
Percent renter occupied	0.2344	-0.1665	-0.0246	-0.1235	-0.0374
Percent vacant units	0.1757	-0.0586	-0.0209	0.0142	-0.1968
Median household value	-0.1762	0.2484	0.2604	0.216	0.2907
Median household income	-0.4096	0.419	0.4399	0.4545	0.449
Percent persons < poverty	0.4535	-0.4568	-0.4728	-0.5169	-0.4557
Percent no English	0.1562	-0.2656	-0.1923	-0.1847	-0.1252
Percent > high school	-0.3328	0.3673	0.4345	0.4559	0.3925
Percent unemployed	0.3718	-0.4053	-0.3429	-0.3322	-0.325
Percent work outside county	-0.1967	0.1228	-0.0892	-0.0663	0.0996
Median number of rooms	-0.4091	0.3314	0.3077	0.2878	0.3501
Percent housing > 10 units	0.0205	0.1325	0.2289	0.0733	0.2017
<b>Crime Construct</b>					
Log violent crime	0.1728	-0.1039	-0.1251	-0.1385	-0.1325

**Table 12. Variable Loadings—Built-Environment Domain**

Built-Environment Domain	Metropolitan-Urbanized (RUCC1 = 1089)	Nonmetropolitan-Urbanized (RUCC2 = 323)	Less Urbanized (RUCC3 = 1059)	Thinly Populated (RUCC4 = 670)	OVERALL (n=3141)
<b>Roads Construct</b>					
Highway proportion	0.1249	-0.0209	0.1275	-0.0106	0.132
Primary streets proportion	0.0857	-0.0744	-0.1143	-0.1103	0.0578
<b>Highway/Road Safety</b>					
Log traffic fatalities	-0.1507	-0.1938	0.0097	0.0272	0.0018
<b>Public Transit Behavior</b>					
Proportion using public transport	0.2794	0.0635	-0.0212	0.074	0.2058
<b>Business Environment</b>					
Log vice-related environment	0.2547	0.2157	0.321	0.3536	0.2687
Log entertainment environment	0.347	0.4422	0.3822	0.3721	0.3585
Log education environment	0.2405	0.2355	0.2866	0.3713	0.3242
Log negative food environment	0.2147	0.2372	0.2536	0.2514	0.2162
Log positive food environment	0.3666	0.4004	0.4241	0.3127	0.2995
Log health care environment	0.4245	0.4497	0.4653	0.4055	0.4241
Log recreation environment	0.212	0.3901	0.3309	0.3434	0.2888
Log transportation environment	0.2998	0.1979	0.1985	0.2752	0.3207
Log civic environment	0.2865	0.2114	0.1692	0.2209	0.2912
<b>Subsidized Housing Environment</b>					
Log total subsidized units	-0.2448	0.0518	0.1440	0.2024	0.2566

### Built-Environment Domain

The variables that comprised the built domain loaded much less consistently across the rural-urban categories (Table 12). In general, there were more inverse or negative variable loadings in the most urban counties compared with the less urbanized counties, and the most rural counties had fairly consistent positive variable loadings.

### Domain-Specific Index Description and Loadings on Overall EQI

The means, standard deviations, and ranges for each domain-specific index are presented in Table 13. In general, higher values of the air and sociodemographic indices were found in the more metropolitan areas, and the most thinly populated areas had the lowest values of each of the indices. Mean values for the land domain index did not vary substantially by RUCC strata. As expected, the index loadings on the overall EQI index were mean (0) and standard deviation (1).

The pattern of association for the domain-specific loadings differed by rural-urban status (Table 14). In the most urban areas, RUCC1, the built-environment domain was most influential, as indicated by its highest loading value (0.52), followed by the air domain (0.51). For the nonmetropolitan-urbanized areas (RUCC2), the sociodemographic and land domains loaded similarly on the overall EQI (0.60 and 0.55, respectively), followed by the built-environment domain. For this particular grouping of counties, the water domain was least influential, based on its low PCA coefficient (0.30). The air domain was the least influential for the less urbanized counties (0.16), followed by the water domain (0.30). In the

most thinly populated counties, the air and water domains were characterized by the lowest loadings (0.03 and 0.13, respectively), whereas the sociodemographic and land domains were the most influential (loadings of 0.63 and 0.58, respectively).

The built and the sociodemographic domains loaded approximately equally on the overall EQI. The air domain also had a somewhat similar loading (0.49). The water domain appeared to contribute least to the overall EQI in the most metropolitan-urbanized areas.

### Description of Overall EQI

The distribution of the RUCC-stratified overall EQI scores is displayed in Figure 4. For these scores, higher values tended toward poorer environments, whereas negative values were associated with healthier (positive domain attributes) environments. The bulk of the EQI scores across all RUCC strata was at the negative end of the distribution, indicating more counties could be characterized by healthier environments, compared with unhealthy (positive) environments. Although more numerous than other RUCC strata, the less urbanized counties (RUCC3) demonstrated the greatest heterogeneity and range of EQI scores (-6.25, 2.34). The thinly populated counties had the smallest range of EQI score (-4.34, 2.06).

Appendix IV contains county mapping of overall EQI, domain-specific indices, RUCC-stratified overall EQI, and RUCC-stratified domain-specific indices.

**Table 13. Description of the Domain Indices Contributing to the Overall and Rural-Urban Continuum Codes (RUCCs) Stratified Environmental Quality Index for 3141 U.S. Counties (2000-2005)**

Metropolitan-Urbanized Areas RUCC1 (n=1089)	Mean	Standard Deviation	Minimum	Maximum
Air domain index	0.756	0.662	-1.780	2.790
Water domain index	0.052	1.019	-1.641	1.478
Land domain index	0.089	0.909	-5.136	2.095
Sociodemographic domain index	0.594	0.955	-3.027	3.979
Built-environment domain index	-0.213	0.878	-4.109	3.884
Nonmetropolitan-Urbanized Areas RUCC2 (n=323)	Mean	Standard Deviation	Minimum	Maximum
Air domain index	0.484	0.474	-1.553	1.517
Water domain index	0.111	1.033	-1.570	1.306
Land domain index	0.089	0.909	-5.019	1.479
Sociodemographic domain index	0.023	0.858	-4.810	2.165
Built-environment domain index	-0.563	0.485	-1.043	2.165
Less Urbanized Areas RUCC3 (n=1059)	Mean	Standard Deviation	Minimum	Maximum
Air domain index	-0.199	0.654	-2.731	1.204
Water domain index	0.066	0.955	-1.565	1.301
Land domain index	-0.069	1.007	-5.139	1.408
Sociodemographic domain index	-0.316	0.854	-4.620	3.127

**Table 13. (continued) Description of the Domain Indices Contributing to the Overall and Rural-Urban Continuum Codes (RUCCs) Stratified Environmental Quality Index for 3141 U.S. Counties (2000-2005)**

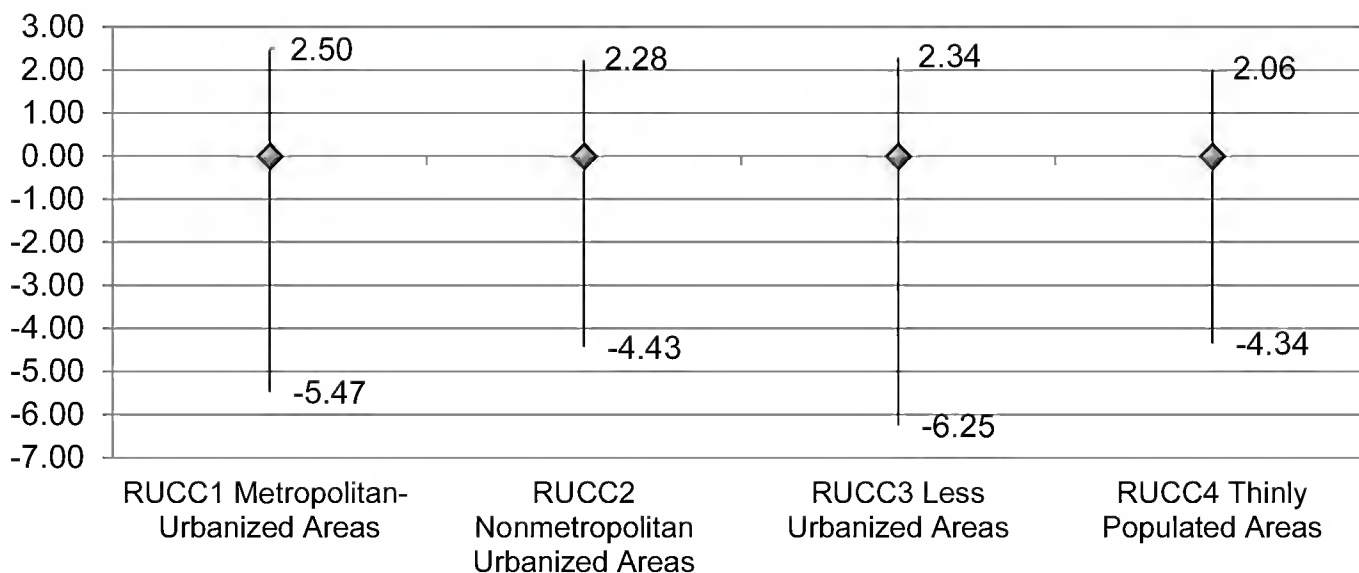
Built-environment domain index	-0.096	0.792	-6.086	3.127
<b>Thinly Populated Areas RUCC4 (n=670)</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
Air domain index	-1.1141	0.879	-3.258	0.7300
Water domain index	-0.241	0.987	-1.555	1.732
Land domain index	-0.072	1.122	-5.210	1.732
Sociodemographic domain index	-0.477	0.860	-4.332	1.263
Built-environment domain index	-0.770	1.225	-5.530	2.787
<b>OVERALL (n=3141)</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
Air domain index	7.17E-10	1	-3.258	2.790
Water domain index	-3.40E-10	1	-1.641	1.478
Land domain index	2.38E-10	1	-5.210	2.095
Sociodemographic domain index	1.71E-09	1	-6.086	3.884
Built-environment domain index	9.72E-11	1	-4.810	3.980

**Table 14. Loadings of the Domain Indices Contributing to the Overall and Rural-Urban Continuum Codes (RUCCs) Stratified Environmental Quality Index for 3141 U.S. Counties (2000-2005)**

<b>Metropolitan-Urbanized Areas RUCC1 (n=1089)</b>	<b>Coefficient/Loading</b>	<b>95% CI</b>
Air domain index	0.5063	0.4379, 0.5747
Water domain index	0.2757	0.1828, 0.3686
Land domain index	0.4379	0.36552, 0.5107
Sociodemographic domain index	0.4538	0.3945, 0.5131
Built-environment domain index	0.5196	0.4565, 0.5827
<b>Nonmetropolitan-Urbanized Areas; RUCC2 (n=323)</b>	<b>Coefficient/Loading</b>	<b>95% CI</b>
Air domain index	0.3343	0.0.80, 0.5705
Water domain index	0.2958	0.0738, 0.5178
Land domain index	0.5506	0.4168, 0.6845
Sociodemographic domain index	0.5963	0.4913, 0.7012
Built-environment domain index	0.3769	0.1719, 0.5819
<b>Less Urbanized Areas RUCC3 (n=1059)</b>	<b>Coefficient/Loading</b>	<b>95% CI</b>
Air domain index	0.1609	0.0477, 0.2740
Water domain index	0.2981	0.1976, 0.3987
Land domain index	0.5503	0.4905, 0.6058
Sociodemographic domain index	0.5675	0.5112, 0.6238
Built-environment domain index	0.5102	0.4479, 0.5726
<b>Thinly Populated Areas RUCC4 (n=670)</b>	<b>Coefficient/Loading</b>	<b>95% CI</b>
Air domain index	0.0285	-0.1507, 0.2076
Water domain index	0.1347	-0.0444, 0.3138

**Table 14. (continued) Loadings of the Domain Indices Contributing to the Overall and Rural-Urban Continuum Codes (RUCCs) Stratified Environmental Quality Index for 3141 U.S. Counties (2000-2005)**

Land domain index	0.5785	0.4920, 0.6649
Sociodemographic domain index	0.6263	0.5555, 0.6972
Built-environment domain index	0.5041	0.3980, 0.6103
<b>OVERALL (n=3141)</b>	<b>Coefficient/Loading</b>	<b>95% CI</b>
Air domain index	0.4867	(0.4543, 0.5192)
Water domain index	0.2618	(0.2161, 0.3074)
Land domain index	0.3887	(0.3493, 0.4281)
Sociodemographic domain index	0.5345	(0.5090, 0.5601)
Built-environment domain index	0.5077	(0.4795, 0.5359)



**Figure 4. Distribution of overall EQI scores across rural-urban continuum code (RUCC) categories.**



# 6.0

## Discussion

### Uses of EQI

An EQI was developed for all counties (N=3141) in the United States, incorporating data for five environmental domains: (1) air, (2) water, (3) land, (4) built, and (5) sociodemographic. For each environmental domain, variables were developed from various datasets, domain-specific indices were created, and the EQI was developed by stratifying by four RUCCs. The loadings varied by domain and RUCC, suggesting that environmental quality is driven by different domains in rural and urban areas. The majority of counties demonstrated values at the negative end of the distribution, suggesting that more counties demonstrated good overall environmental quality rather than poor environmental quality.

The EQI holds promise for improving the environmental estimation in public health. The EQI describes the ambient county-level conditions to which residents are exposed, whether they are at home, at school, or at work, provided these multiple human activity spaces occur in the same county. Use of the EQI will help public health researchers investigate cumulative impact of various diverse constructs that typically are viewed in isolation. Each of the domain-specific pieces of information, which contribute to the EQI, is also informative. Because most environmental health practice occurs on a domain-specific basis, this domain-specific information may be important to policymakers and environmental health activists. The domain-specific loadings to the EQI indicate which of the environmental domains accounts for the largest portion of the variability in the EQI; in essence, these loadings answer the question as to which domain is making the biggest contribution to the total environment. In addition, the variable loadings on each of the domains are also informative for the same reason. In the land environment, for instance, it might be important to know whether pesticides or Superfund sites seem to be contributing the largest share of variability to the land index. This information has obvious implications for public health intervention. The RUCC-stratified domains and EQI indices also will make an important public health contribution. Urban-rural areas are known to differ in important ways; these RUCC-stratified indices help disentangle what domains may be driving some of the observed urban-rural differences in public health outcomes.

The EQI offers a comprehensive measure of environmental quality for all counties in the United States and is comprised of many of the best environmental measures currently available. The EQI can be used as a general health exposure metric to help identify environmental health

issues for communities. It provides information on overall environmental exposures faced in a community. In addition, because collection of data was relevant to the entire United States, the EQI is comparable across communities to help identify areas of better and worse overall environmental quality. The development of domain-specific indices enables communities to assess the drivers of poor environmental quality in their community. Additionally, because it is comparable across counties, areas that are burdened most by poor environmental quality can be identified. Finally, the EQI can be used in a variety of environmental health research activities as a control variable to adjust for overall environmental exposure, while trying to isolate a specific effect. Such a control variable will provide better estimates of effects without confounding by co-occurring environmental factors.

The EQI is a national-level index that potentially can provide a better understanding into how multiple environmental conditions affect U.S. counties. At its current county-level scale, the EQI may not reveal environmental injustices seen at the local community level. However, it does highlight those counties experiencing an increased burden of environmental impacts. Further, the EQI can contribute to environmental justice endeavors by describing

- the process by which EQI data were obtained,
- how the EQI was constructed, and
- the Web sites containing available data that can be used to construct indices at different levels of aggregation.

The EQI can be a tool for interested investigators to consider constructing local EQIs and adding relevant, local-level data for more focused comparisons.

### Strengths and Limitations

#### Data

Data sources evaluated represented each of the five environmental domains. Each data source was reasonably well documented. Despite finding a considerable number of data sources applicable to each environmental domain, significant data gaps exist.

The data used to create the index balanced quality measurement with geographic breadth of coverage. Therefore, the index does a solid job estimating the ambient environment but may be less useful for estimating specific environments (e.g., in a particular location in the United States [not county] at a specific time). Not all relevant environmental exposures were necessarily included in the index. Data inclusion was dependent on data collection

and coverage; if relevant data were not being collected, the information was not captured in the EQI. Relatedly, in areas where little data collection occurs, the data may be overrepresenting the environmental profile of those areas. For example, a county that contains a National Park without data collected and a town with data collection will be solely represented by the town area, although that may be inaccurate for the entire county. Conversely, environments with a wealth of environmental measurements, like urban areas, will be better estimated by the EQI.

Environmental data sources often are plagued by inadequate spatial and temporal coverage. Most of the data sources obtained for the EQI required spatial interpolation to achieve county-level estimates. For example, even with extensive air monitoring networks, the measured spatial coverage of the United States was incomplete, particularly in rural areas. Some types of measures were located disproportionately in urban areas (e.g., PM air pollution), whereas others are found in rural areas (e.g., industrial livestock operations). The nonrandom distribution of environmental risk meant that virtually all interpolated data were inaccurate, impairing the assessment of how pollutants differentially impacted urban and rural areas.

From a human health perspective, probably the biggest limitation to existing environmental data sources is that data are collected with little thought given to potential health impacts. For instance, monitoring sites may collect relevant air pollutant data, but their location (e.g., air monitors located on top of buildings) is inappropriate for assessing the street-level values to which humans are exposed. Pesticide data, from the land domain, usually reports pesticide sales in relation to crops and livestock, not application, handling, or disbursement. Even the US Census, which is widely used in health research, primarily is collected for tax and political districting purposes. Some of the data sources identified have not been used in human health research and, as such, are a limitation. Regularly collected, high-quality data that considers probable human health impacts would make the task of assessing differential exposures considerably easier.

Environmental data also were collected rarely with adequate temporal frequency. Although data on some parameters were collected on a consistent and frequent basis, the majority were not. Water data, for instance, were collected only sporadically in response to a particular query or based on regulatory statute. Within the sociodemographic domain, the complete U.S. Census was collected decennially, which limits investigators' capacity to explore temporal changes. Characteristics of places can change rapidly, but, under current data collection schedules, these changes cannot be assessed. Initially, the EQI looked to estimate yearly measures. However, ultimately, only a 6-year (2000-2005) measure was created because of the lack of yearly data for some of the variables.

Many environmental parameters were compiled at a smaller unit of aggregation (e.g., for a municipality or city), and most were not maintained in a single source, such as a

data repository. Although national repositories for some domains exist (e.g., water, air), often in response to Federal regulations, no built-environment repository exists (for transit, walkability/physical activity, street connectivity, presence of sidewalks, or pedestrian lighting measures). Localities with limited funds may not be motivated—or able—to collect these data.

### **PCA Methodology**

The use of PCA was not without limitations. Normality is an important assumption for PCA, and not all the data were normally distributed in their raw form. Many of the nonnormal variables were those with a substantial number of meaningful zeros (e.g., there were no public housing units contained within these counties). This “absence” of attribute is important information to convey, and, yet, it was problematic from a score-construction perspective. Although transforming the data improved their distribution, it reduced each variable's interpretability. A PCA-derived score also can be challenging to interpret. Outliers in the data also can be a limitation. However, with 3141 counties and normality checks, this is less problematic in the EQI.

Although limited, the use of PCA was also an important strength of this project. PCA provided a means to overcome one of the significant limitations in the field of environmental health and combine multiple environmental domains into one index of ambient environmental quality; the whole endeavor would not have been possible without this data reduction strategy. The resulting scale is standardized, which will facilitate its comparison to other scales constructed in different countries or at different units of aggregation. Further, it is the approach that has been used in other scale or score construction activities.<sup>77, 78</sup>

### **Application**

Use of the EQI as a measure of exposure assumes exposure to “environment” is consistent for all individuals, but the extent of environmental exposure was not assessable. The EQI was focused solely on the outside environment, which may not be the most relevant exposure in relation to human health and disease. Finally, population-level analyses offer little predictive utility for individual-level risk. Therefore, although the index may be useful at identifying less healthy environments, it will not be useful for predicting individual-level adverse outcomes.

The EQI was developed for research purposes and is not meant to be a diagnostic tool. The EQI would be useful to identify potential areas of concern for counties to target future research, but it should not be used to target regulatory purposes.

### **Sensitivity Analyses**

Different types of sensitivity analyses are planned or have been completed for the EQI. The only domain with a completed sensitivity analysis is the water domain. For the other four domains, planned activities are presented.

Three alternate air domain constructions are planned for forthcoming sensitivity analyses. To assess the influence of HAPs on the air domain, two alternate datasets were created.



One contains only criteria air pollutant variables, and the other reduces HAP variables to a count variable. This variable reduction was accomplished by assigning a value of 1 to each value above the 25th percentile for that HAP, then summing across HAPs for each county. This method incorporates all estimated HAPs from the 2002 NATA, rather than a subset. Because of differences in variable elimination chronology, the HAPs were excluded before log-transformation occurred. A dataset was constructed by log transforming all HAPs before correlation exclusion criteria were applied, examining the variables with correlations above 0.7, and selecting a single variable to represent highly correlated pairs or groups.

Sensitivity analysis was conducted on the variables included in the water domain. The primary water domain index was developed using data from five data sources and representing eight constructs. Variables were created using data from two additional data sources for variables in the atmospheric deposition and chemical contamination constructs. The variables were created from the National Water Information System database and the Safe Drinking Water Information System database. Alternative indices were constructed either by exchanging a single variable or by exchanging all variables for which alternate variables were available. Concordance correlation coefficients (ccc's) were used to assess similarity to the primary index. The sensitivity analysis demonstrated strong correlations when comparing alternative indices to the primary index. The lowest correlation was seen for the full alternate index (all available variables replaced) compared with the primary index (ccc: 0.999018 [95% CI: 0.998949, 0.999082]). The greatest differences between the indices were seen in the southeastern and northwestern United States. Therefore, the sensitivity analysis demonstrated differing sources of variables did not alter county ranking, which indicated the water domain index is robust with choice of measures.

Forthcoming sensitivity analyses for the land domain will involve constructing alternative agriculture variables using Dun and Bradstreet agriculture data. Variables that are comparable to those employed in the EQI will be used. Alternative types of variables will be used for EQI sensitivity analyses. Constructing a different type of facilities variable also will be explored, in which a count of facilities per square mile is constructed. The current facilities variable estimates count of facilities per county population; the sensitivity analysis facilities variable will enable consideration of a facilities variable with a land, versus population, impact.

For the sociodemographic domain, sensitivity analyses will involve the use of alternative crime and census data. Many different types of data can be used to represent county deprivation/affluence, and the sensitivity analyses will employ a different set of data to assess how robust the loadings are to the variables chosen to represent the domain. Similarly for the built domain, an extremely inclusive strategy was employed for constructing the various business-related environments. Most businesses that plausibly could be related to education, for instance, were included in the

education-related business variable. The sensitivity analysis for the built domain will revisit some of those inclusion criteria and construct less inclusive environmental variables for use in the built-environment domain.

## Other Environmental Indices

Although well-established environmental indices exist, the EQI makes a unique contribution to the environmental health literature. The Yale Center for Environmental Law and Policy and the Center for Earth Information Science Information Network at Columbia University developed the Environmental Sustainability Index (ESI) in 2000.<sup>77</sup> The ESI, the predecessor to the Environmental Performance Index (EPI), was launched as a complement to the Millennium Development Goals. Both the ESI and EPI are country-level indices. The ESI included 76 elements, but the more current EPI was pared down to 22 performance indicators for which countries can be held accountable. Important similarities between the EPI and EQI exist. Both indices rely on similar data sources (official statistics, monitoring data, modeled data, and spatial data), prepare data similarly for variable construction (e.g., use of population denominators to construct standardized weights), employ weighting and aggregation in construction, and use child mortality as an indicator of environmental health. The comparability between the EQI and the EPI is a strength of this research. The EPI differs from the EQI in important ways, however. The EPI includes a narrower set of environmental domains (environmental health, water effects on human health, air pollution effects on human health, air pollution [ecosystem effects], water resources [ecosystems effects], biodiversity and habitat, forests, fisheries, agriculture, climate change, and energy). It also is constructed using target-based indicators for assessing country-level performance for specific environmental health indicators. Its international focus also requires a much larger unit of aggregation—the country—than was intended for the EQI.

Another index, which explored natural environment vulnerability, was developed by the South Pacific Applied Geoscience Commission, the United Nations Environment Programme, and their partners. The Environmental Vulnerability Index (EVI)<sup>79</sup> was developed through collaboration with countries, institutions, and experts across the globe and was designed for use with other economic and social vulnerability indices to provide insights in the processes that can negatively influence the sustainable development of countries. EVI is based on 50 indicators for estimating country-level environmental vulnerability. Unlike the EQI, it is constructed by averaging the various measures. One limitation of the EVI is that it does not reflect environments dominated by human systems (e.g., cities, farms).

Most other environmental quality indices focus on one environmental domain (e.g., Air Quality Index<sup>80</sup>) or a specific type of activity (e.g., Pedestrian Environmental Quality Index<sup>81</sup>) or vulnerability (e.g., Cumulative Environmental Vulnerability Assessment,<sup>82</sup> heat vulnerability index<sup>83</sup>).

State-specific indices also exist, (e.g., CalEnviro Screen 1.0,<sup>84</sup> Virginia Environmental Quality Index<sup>85</sup>), but their comparability across States is limited by their respective data sources and construction.

## Conclusions

The EQI was constructed for all counties (N=3141) in the United States, incorporating data for five environmental domains, (1) air, (2) water, (3) land, (4) built, and (5) sociodemographic, and stratified by RUCCs. The techniques used were based on a reproducible approach that almost exclusively accesses publicly available data sources. This effort was a first step in the direction of assessing multiple environmental exposures. The EQI will be used as a measure in environmental health research. This broad-based effort acknowledges the many factors that together impact environmental quality and, more generally, recognizes that these factors work together to impact public health. Updates to the EQI for 2006-2010 are planned, as well as exploration of other finer spatial aggregations.



# 7.0

## References

1. Payne-Sturges, D., et al., Workshop summary: connecting social and environmental factors to measure and track environmental health disparities. *Environ Res*, 2006. 102(2): p. 146-53.
2. Mohai, P., et al., Racial and socioeconomic disparities in residential proximity to polluting industrial facilities: evidence from the Americans' Changing Lives Study. *Am J Public Health*, 2009. 99 Suppl 3: p. S649-56.
3. Payne-Sturges, D. and G.C. Gee, National environmental health measures for minority and low-income populations: tracking social disparities in environmental health. *Environ Res*, 2006. 102(2): p. 154-71.
4. Fan, A.M., G. Alexeeff, and S.B. Harris, Cumulative risks and cumulative impacts of environmental chemical exposures. *Int J Toxicol*, 2010. 29(1): p. 57.
5. Martuzzi, M., F. Mitis, and F. Forastiere, Inequalities, inequities, environmental justice in waste management and health. *Eur J Public Health*, 2010. 20(1): p. 21-6.
6. Johnson, B.L. and S.L. Coulberson, Environmental epidemiologic issues and minority health. *Ann Epidemiol*, 1993. 3(2): p. 175-80.
7. Norton, J.M., et al., Race, wealth, and solid waste facilities in North Carolina. *Environ Health Perspect*, 2007. 115(9): p. 1344-50.
8. Larson, N.I., M.T. Story, and M.C. Nelson, Neighborhood environments: disparities in access to healthy foods in the U.S. *Am J Prev Med*, 2009. 36(1): p. 74-81.
9. Lovasi, G.S., et al., Built environments and obesity in disadvantaged populations. *Epidemiol Rev*, 2009. 31: p. 7-20.
10. United States Environmental Protection Agency (EPA), EPA's 2008 Report on the Environment. 2008: Washington, DC.
11. United States Environmental Protection Agency (EPA). Strengthening Environmental Justice Research and Decision Making: A Symposium on the Science of Disproportionate Environmental Health Impacts. 2010 [cited 2013 July 1]; Available from [http://www.epa.gov/ncer/events/news/2010/03\\_17\\_10\\_calendar.html](http://www.epa.gov/ncer/events/news/2010/03_17_10_calendar.html).
12. Reynolds, P., et al., Childhood cancer incidence rates and hazardous air pollutants in California: an exploratory analysis. *Environ Health Perspect*, 2003. 111(4): p. 663-8.
13. Kalkbrenner, A.E., et al., Perinatal exposure to hazardous air pollutants and autism spectrum disorders at age 8. *Epidemiology*, 2010. 21(5): p. 631-41.
14. United States Environmental Protection Agency (EPA), Integrated Science Assessment for Oxides of Nitrogen - Health Criteria. 2008, National Center for Environmental Assessment-RTP Division.
15. United States Environmental Protection Agency (EPA), Integrated Science Assessment for Sulfur Oxides - Health Criteria. 2008, National Center for Environmental Assessment-RTP Division.
16. United States Environmental Protection Agency (EPA), Integrated Science Assessment for Particulate Matter. 2009, National Center for Environmental Assessment-RTP Division.
17. United States Environmental Protection Agency (EPA), Integrated Science Assessment for Carbon Monoxide. 2010, National Center for Environmental Assessment-RTP Division.
18. United States Environmental Protection Agency (EPA), Integrated Science Assessment for Ozone and Related Photochemical Oxidants. 2013, National Center for Environmental Assessment-RTP Division.
19. United States Environmental Protection Agency (EPA), Integrated Science Assessment for Lead. 2013, National Center for Environmental Assessment-RTP Division.
20. Morris, R.D., Drinking water and cancer. *Environ Health Perspect*, 1995. 103 Suppl 8: p. 225-31.
21. Ercumen, A., J.S. Gruber, and J.M. Colford, Jr., Water distribution system deficiencies and gastrointestinal illness: a systematic review and meta-analysis. *Environ Health Perspect*, 2014. 122(7): p. 651-60.
22. Villanueva, C.M., et al., Assessing exposure and health consequences of chemicals in drinking water: current state of knowledge and research needs. *Environ Health Perspect*, 2014. 122(3): p. 213-21.
23. Vakonaki, E., et al., Pesticides and oncogenic modulation. *Toxicology*, 2013. 307: p. 42-5.
24. Mostafalou, S. and M. Abdollahi, Pesticides and human chronic diseases: evidences, mechanisms, and perspectives. *Toxicol Appl Pharmacol*, 2013. 268(2): p. 157-77.
25. Sharma, R., et al., The impact of incinerators on human health and environment. *Rev Environ Health*, 2013. 28(1): p. 67-72.
26. Durand, C.P., et al., A systematic review of built environment factors related to physical activity and obesity risk: implications for smart growth urban planning. *Obes Rev*, 2011. 12(5): p. e173-82.
27. Gittelsohn, J., M. Rowan, and P. Gadhoke, Interventions in small food stores to change the food environment, improve diet, and reduce risk of chronic disease. *Prev Chronic Dis*, 2012. 9: p. E59.
28. Vos, A.A., et al., Deprived neighborhoods and adverse perinatal outcome: a systematic review and meta-analysis. *Acta Obstet Gynecol Scand*, 2014. 93(8): p. 727-40.
29. Powell-Wiley, T.M., et al., Neighborhood-level socioeconomic deprivation predicts weight gain in a multi-ethnic population: Longitudinal data from the Dallas Heart Study. *Prev Med*, 2014. 66: p. 22-7.
30. Major, J.M., et al., Neighborhood socioeconomic deprivation and mortality: NIH-AARP diet and health study. *PLoS One*, 2010. 5(11): p. e15538.
31. Lorenc, T., et al., Crime, fear of crime, environment, and mental health and wellbeing: mapping review of theories and causal pathways. *Health Place*, 2012. 18(4): p. 757-65.
32. Messer, L.C., et al., Neighborhood crime, deprivation, and preterm birth. *Ann Epidemiol*, 2006. 16(6): p. 455-62.
33. United States Environmental Protection Agency (EPA). The Ambient Air Monitoring Program. 2010 [cited 2010 July 15]; Available from <http://www.epa.gov/air/oaqps/qa/monprog.html>.
34. United States Environmental Protection Agency (EPA). National Air Toxics Assessments. [cited 9/10/2010]; Available from: <http://www.epa.gov/ttn/atw/natamain/>.
35. United States Environmental Protection Agency (EPA), Watershed Assessment, Tracking and Environmental Results (WATERS). 2010.
36. United States Environmental Protection Agency (EPA). National Contaminant Occurrence Database (NCOD). 2010 [cited 2010 August 26]; Available from <http://water.epa.gov/scitech/datait/databases/drink/ncod/databases-index.cfm>.
37. United States Geological Survey (USGS). Estimated Use of Water in the United States. [cited 2010 August 26]; Available from <http://water.usgs.gov/watuse/>.

38. National Drought Mitigation Center (NDMC). Drought Monitor Data Downloads. August 26, 2010 [cited 2010 August 26]; Available from [http://www.drought.unl.edu/dm/dmshps\\_archive.htm](http://www.drought.unl.edu/dm/dmshps_archive.htm).
39. National Atmospheric Deposition Program. National Atmospheric Deposition Program. [cited 2010 August 26]; Available from <http://nadp.sws.uiuc.edu/>.
40. United States Geological Survey (USGS). National Water Information System (NWIS). <http://qwwebsiteservices.usgs.gov/> [cited 2010 August 26]; Available from <http://qwwebsiteservices.usgs.gov/>.
41. United States Environmental Protection Agency (EPA). Safe Drinking Water Information System. [cited 2010 August 26]; Available from <http://water.epa.gov/scitech/datait/databases/drink/sdwisfed/>.
42. Agricultural Research Service (ARS). Nutrient Loss Database for Agricultural Fields in the U.S. <http://www.ars.usda.gov/Research/docs.htm?docid=11079> [cited 2010 August 26]; Available from <http://www.ars.usda.gov/Research/docs.htm?docid=11079>.
43. Gianessi, L. and N. Reigner. Pesticide Use in U.S. Crop Production: 2002. Insecticides & Other Pesticides. 2006, CropLife Foundation: Washington, DC.
44. United States Department of Agriculture (USDA). 2002 Census of Agriculture full report. 2002 [cited 2010 August 26]; Available from <http://www.agcensus.usda.gov/Publications/2002/index.asp>.
45. Dun and Bradstreet. Dun and Bradstreet Products. 2010 [cited 2010 August 26]; Available from [http://www.dnb.com/us/dbproducts/product\\_overview/index.html](http://www.dnb.com/us/dbproducts/product_overview/index.html).
46. United States Environmental Protection Agency (EPA). EPA Geospatial Data Download Service. 2013 [cited 2013 September 10]; Available from [http://www.epa.gov/envirofw/geo\\_data.html](http://www.epa.gov/envirofw/geo_data.html).
47. United States Environmental Protection Agency (EPA). Superfund National Priorities List (NPL) Sites. 2010; Available from <http://www.epa.gov/superfund/sites/npl/index.htm>.
48. United States Environmental Protection Agency (EPA). Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal Facilities (TSD) and (RCRA) Corrective Action Facilities. 2010 [cited 2010 August 26]; Available from <http://www.epa.gov/osw/hazard/tsd/index.htm>.
49. United States Environmental Protection Agency (EPA). Resource Conservation and Recovery Act (RCRA) Large Quantity Generators (LQG). 2010 [cited 2010 August 26]; Available from <http://www.epa.gov/osw/hazard/generation/lqg.htm>.
50. United States Environmental Protection Agency (EPA). Toxics Release Inventory (TRI) Sites. 2010 [cited 2010 August 26]; Available from <http://www.epa.gov/tri/>.
51. United States Environmental Protection Agency (EPA). Assessment, Cleanup, and Redevelopment Exchange (ACRES) Brownfield Sites. 2010 [cited 2010 August 26]; Available from <http://www.epa.gov/brownfields/>.
52. United States Environmental Protection Agency (EPA). Section Seven Tracking System (SSTS) Pesticide Producing Site Locations. 2010 [cited 2010 August 26]; Available from <http://www.epa.gov/compliance/data/systems/toxics/sstsys.html>.
53. United States Geologic Services (USGS). National geochemical survey. 2010 [cited 2010 August 26]; Available from <http://tin.er.usgs.gov/geochem/doc/averages/countydata.htm>.
54. United States Environmental Protection Agency (EPA). Map of radon zones. 2010 [cited 2010 August 26]; Available from <http://www.epa.gov/radon/zonemap.html>.
55. United States Census Bureau. American FactFinder. 2000; Available from (<http://factfinder.census.gov>).
56. Federal Bureau of Investigation (FBI). Uniform Crime Reports. 2010 [cited 2010 August 26]; Available from <http://www.fbi.gov/ucr/ucr.htm>.
57. United States Census Bureau. Topologically Integrated Geographic Encoding and Referencing. 2010 [cited 2010 August 26]; Available from <http://www.census.gov/geo/www/tiger/>.
58. National Highway Traffic Safety Administration (NHTSA), N.C.f.S.a.A.N. Fatality Analysis Reporting System (FARS). 2010 [cited 2010 August 26]; Available from <http://www.nhtsa.gov/people/nscsa/fars.html>.
59. Whitsel EA, et al., Accuracy of commercial geocoding: assessment and implications. *Epidemiologic Perspectives and Innovations*, 2006. 3(8): p. 3-8.
60. United States Department of Housing and Urban Development. Multifamily Assistance and Section 8 Contracts Database. [cited 2012 November 28]; Available from [http://portal.hud.gov/hudportal/HUD?src=/program\\_offices/housing/mfh/exp/mfhdiscl](http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/mfh/exp/mfhdiscl).
61. United States Environmental Protection Agency (EPA). Watershed Assessment, Tracking and Environmental Results (WATERS). [cited 2010 August 26]; Available from <http://www.epa.gov/waters/>.
62. Lee, S.J., et al., Comparison of geostatistical interpolation and remote sensing techniques for estimating long-term exposure to ambient PM<sub>2.5</sub> concentrations across the continental United States. *Environ Health Perspect*, 2012. 120(12): p. 1727-32.
63. Clean Water Act of 1972.
64. United States Environmental Protection Agency (EPA). Reach Address Database. 2010 [cited 2013 May 31, 2013]; Available from <http://www.epa.gov/waters/doc/rad/index.html>.
65. McKay, L., et al., NHDPlus Version 2: User Guide, United States Environmental Protection Agency (EPA), Editor. 2012.
66. United States Environmental Protection Agency (EPA). National Pollutant Discharge Elimination System (NPDES). February 16, 2012 [cited 2013 July 26]; Available from [http://cfpub.epa.gov/npdes/home.cfm?program\\_id=45](http://cfpub.epa.gov/npdes/home.cfm?program_id=45).
67. Kellog R.L., L.C.H., Moffitt D.C., Gollehon N., Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients: Spatial and Temporal Trends for the United States. 2000, United States Department of Agriculture.
68. National Technical Information Service. Federal Information Processing Standards Publications (FIPS PUBS). [cited 2013 August 1]; Available from <http://www.nist.gov/itl/fips.cfm>.
69. Tabachnick, B.G. and L.S. Fidell, Using Multivariate Statistics. 5th ed. 2007, Boston: Pearson Allyn & Bacon.
70. Hall, S.A., J.S. Kaufman, and T.C. Ricketts, Defining urban and rural areas in U.S. epidemiologic studies. *J Urban Health*, 2006. 83(2): p. 162-75.
71. United States Department of Agriculture (USDA). Measuring rurality: Rural-urban continuum codes. April 3, 2008 [cited 2008 April 3]; Available from <http://www.ers.usda.gov/Briefing/Rurality/ruralurbcon/>.
72. Langlois, P.H., et al., Occurrence of conotruncal heart birth defects in Texas: a comparison of urban/rural classifications. *J Rural Health*, 2010. 26(2): p. 164-74.
73. Messer, L.C., et al., Urban-rural residence and the occurrence of cleft lip and cleft palate in Texas, 1999-2003. *Ann Epidemiol*, 2010. 20(1): p. 32-9.
74. Langlois, P.H., et al., Urban versus rural residence and occurrence of septal heart defects in Texas. *Birth Defects Res A Clin Mol Teratol*, 2009. 85(9): p. 764-72.
75. Luben, T.J., et al., Urban-rural residence and the occurrence of neural tube defects in Texas, 1999-2003. *Health Place*, 2009. 15(3): p. 848-54.
76. Kim J-O., M.C.W., Factor Analysis: Statistical Methods and Practical Issues. Vol. 07-014. 1978, Newbury Park, CA: Sage.
77. Emerson, J., et al., 2012 Environmental Performance Index and Pilot Trend Environmental Performance Index - Full Report. 2012, Yale Center for Environmental Law and Policy: New Haven.

78. Messer, L.C., et al., The development of a standardized neighborhood deprivation index. *J Urban Health*, 2006. 83(6): p. 1041-62.
79. EVI Official Global Website. The Environmental Vulnerability Index. 2013 [cited 2013 August 1]; Available from <http://www.vulnerabilityindex.net/>.
80. AirNow. Air Quality Index. [cited 2013 August 1]; Available from: <http://www.airnow.gov/?action=aqibasics.aqi>.
81. San Francisco Department of Public Health. Pedestrian Environmental Quality Index. [cited 2013 August 1]; Available from <http://www.sfpbes.org/elements/24-elements/tools/106-pedestrian-environmental-quality-index>.
82. Huang, G. and J. London, Cumulative environmental vulnerability and environmental justice in California's San Joaquin Valley. *Int J environ Res Public Health*, 2012. 9: p. 1593-1608.
83. Reid, C., et al., Evaluation of a heat vulnerability index on abnormally hot days: an environmental public health tracking study. *Environ Health Perspect*, 2012. 120: p. 715-720.
84. California Environmental Protection Agency, California Communities Environmental Health Screening Tool, Version 1 (CalEnviroScreen 1.0). 2013, California Environmental Protection Agency: Sacramento, CA.
85. Studies, V.C.f.E. Virginia Environmental Quality Index. [cited 2013 August 9]; Available from <http://www.veqi.vcu.edu/>.





# Appendix I

## Modified Data Inventory

A listing of the different databases found through the data inventory. For complete information about the data source go to <https://edg.epa.gov/metadata/catalog/main/home.page>, where the full data inventory can be downloaded.

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
BOUNDARY DATA										
4	Air	California Air Basins	The California Air Basins layer is a polygon shapefile representing the 15 California air basins, as defined in state statute and regulation.	CEPA	CEPA	CA	air basin	not applicable	No	Non-informative
5	Air	California Air Districts	The California Air Districts layer is a polygon shapefile representing the California air pollution control and air quality management districts, as defined in federal and state law.	CEPA	CEPA	CA	air district	not applicable	No	Non-informative
6	Air	State O <sub>3</sub> , NO <sub>2</sub> , SO <sub>2</sub> , PB, VRP - California	The State O <sub>3</sub> , NO <sub>2</sub> , SO <sub>2</sub> , PB, VRP designations layer is a polygon shapefile showing area designations as required under Health and Safety Code section 39608 for ozone, nitrogen dioxide, sulfur dioxide, lead, and visibility reducing particles.	CEPA	CEPA	CA	air district	not applicable	No	Non-informative
7	Air	State PM <sub>2.5</sub> - California	The State PM <sub>2.5</sub> designations layer is a polygon shapefile showing area designations as required under Health and Safety Code section 39608.	CEPA	CEPA	CA	air district	not applicable	No	Non-informative
8	Air	State PM <sub>10</sub> - California	The State PM <sub>10</sub> designations layer is a polygon shapefile showing area designations as required under Health and Safety Code section 39608.	CEPA	CEPA	CA	air district	not applicable	No	Non-informative
9	Air	State Carbon Monoxide - California	The State Carbon Monoxide designations layer is a polygon shapefile showing area designations as required under Health and Safety Code section 39608.	CEPA	CEPA	CA	air district	not applicable	No	Non-informative
10	Air	State Sulfates - California	The State Sulfates designations layer is a polygon shapefile showing area designations as required under Health and Safety Code section 39608.	CEPA	CEPA	CA	air district	not applicable	No	Non-informative
11	Air	State Hydrogen Sulfide - California	The State Hydrogen Sulfide designations layer is a polygon shapefile showing area designations as required under Health and Safety Code section 39608.	CEPA	CEPA	CA	air district	not applicable	No	Non-informative
57	Air	Nonattainment Boundaries - 8-Hour Ozone	A GIS file of counties that were nonattainment for the 8-hr ozone (1997 standard) as of June 2005.	EPA	EPA	conterminous US	county	county	No	Non-informative

## Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
58	Air	Nonattainment Boundaries - PM <sub>2.5</sub>	A GIS file of counties that were nonattainment for the PM <sub>2.5</sub> (1997 standard) as of June 2005.	EPA	EPA	conterminous US	county	county	No	Non-informative
59	Air	Nonattainment Boundaries - Carbon Monoxide	A list of nonattainment counties for CO (1997 standard).	EPA	EPA	conterminous US	not applicable	county	No	Non-informative
60	Air	Nonattainment Boundaries - Nitrogen Dioxide	A list of nonattainment counties for NO <sub>2</sub> (1997 standard).	EPA	EPA	conterminous US	not applicable	county	No	Non-informative
61	Air	Nonattainment Boundaries - Sulfur Dioxide	A list of nonattainment counties for SO <sub>2</sub> (1997 standard).	EPA	EPA	conterminous US, AK and Guam	not applicable	county	No	Non-informative
62	Air	Nonattainment Boundaries - PM <sub>10</sub>	A list of nonattainment counties for PM <sub>10</sub> (1997 standard).	EPA	EPA	conterminous US, AK and Puerto Rico	not applicable	county	No	Non-informative
63	Air	Nonattainment Boundaries - Lead	A list of nonattainment counties for PB (1997 standard).	EPA	EPA	conterminous US, AK	not applicable	county	No	Non-informative
CONCENTRATION DATA										
14	Air	Air Toxics - Indiana	Air toxic monitoring data from Indiana.	IDEM	IDEM	urban Indiana	point	not applicable	No	Spatial coverage
64	Air	AQS - Hourly Ozone Data	Hourly ozone data from AQS in .csv format at sites throughout US.	EPA	EPA	conterminous US	not applicable	not applicable	Yes	N/A
65	Air	AQS - Daily Ozone Data	Daily 1- and 8-hour maximum ozone values from AQS in .csv format at sites throughout US.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and some Mexico	not applicable	not applicable	No	Represented elsewhere
66	Air	AQS - Annual Ozone Data	Annual 1- and 8-hour maximum value ozone data from AQS in .csv format for sites throughout US.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and some Mexico	not applicable	not applicable	No	Represented elsewhere
67	Air	AQS - Sulfur Dioxide Data - 5-minute values	Average SO <sub>2</sub> concentration on 5-minute intervals.	EPA	EPA	southeastern NC	not applicable	not applicable	No	Represented elsewhere
68	Air	AQS - SO <sub>2</sub> Data - Hourly Max 5-minute values	Maximum SO <sub>2</sub> concentration on 5-minute intervals.	EPA	EPA	regional - see areal estimate	not applicable	not applicable	No	Represented elsewhere
69	Air	AQS - Arsenic Total Suspended Particulate Matter	Ambient concentration monitoring data for arsenic total suspended particulate matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
70	Air	AQS - Benzene (including benzene from gasoline)	Ambient concentration monitoring data for benzene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
71	Air	AQS - Benzyl Chloride	Ambient concentration monitoring data for benzyl chloride made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
72	Air	AQS - Beryllium (PM <sub>10</sub> )	Ambient concentration monitoring data for beryllium (PM <sub>10</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
73	Air	AQS - Beryllium (PM <sub>2.5</sub> )	Ambient concentration monitoring data for beryllium (PM <sub>2.5</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
74	Air	AQS - Beryllium Total Suspended Particulate Matter	Ambient concentration monitoring data for beryllium total suspended particulate matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
75	Air	AQS - Biphenyl	Ambient concentration monitoring data for biphenyl made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
76	Air	AQS - Bromoform	Ambient concentration monitoring data for bromoform made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
77	Air	AQS - 1,3-Butadiene	Ambient concentration monitoring data for 1,3-butadiene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
78	Air	AQS - Carbon Monoxide Concentration	Hourly ambient CO concentrations at site locations across the country, provided as an annual file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	Yes	N/A
79	Air	AQS - Lead - PB - daily	Daily ambient lead concentrations at site locations across the country, provided as an annual file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	N/A
80	Air	AQS - Nitrogen Dioxide	Hourly ambient nitrogen dioxide concentrations at site locations across the country, provided as an annual file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	Yes	N/A
81	Air	AQS - Ozone Hourly	Hourly ambient ozone concentrations at site locations across the country, provided as an annual file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	Yes	N/A
82	Air	AQS - Oxides of Nitrogen	Hourly ambient NO <sub>x</sub> concentrations at site locations across the country, provided as an annual file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
83	Air	AQS - Volatile Organic Compounds (VOC) - PAMS	Weekly average ambient VOC concentrations from photochemical assessment monitoring stations (PAMS), provided as an annual file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
84	Air	AQS - PM <sub>2.5</sub> Daily - local conditions	Daily average ambient PM <sub>2.5</sub> concentrations at site locations across the country, provided as an annual file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	Yes	N/A
85	Air	AQS - PM Fine Speciation - weekly	Weekly average ambient PM fine speciation concentrations at site locations across the country, provided as an annual file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
86	Air	AQS - PM Fine Speciation Blanks	Weekly average ambient PM fine speciation blanks concentrations at site locations across the country, provided as an annual file. See additional info in Notes section below.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
87	Air	AQS - PM Fine - IMPROVE	3-day average ambient PM fine concentrations at site locations across the country, provided as an annual file. These are Interagency Monitoring of Protected Visual Environments (IMPROVE) data provided in AQS format to simplify analysis with other AQS data.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
88	Air	AQS - PM <sub>10</sub>	Weekly average ambient PM <sub>10</sub> concentrations at site locations across the country, provided as an annual file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	Yes	N/A
89	Air	AQS - PM <sub>2.5</sub> Non Reference - hourly	Hourly ambient PM <sub>2.5</sub> concentrations at site locations across the country, provided as an annual file. Non reference data are less accurate than other PM data provided by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
90	Air	AQS - Reactive Oxides of Nitrogen - NO <sub>y</sub>	Hourly ambient oxides of nitrogen concentrations at site locations across the country, provided as an annual file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere

**Air Domain**

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
91	Air	AQS - Sulfur Dioxide - hourly	Hourly ambient sulfur dioxide concentrations at site locations across the country, provided as an annual file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	Yes	N/A
92	Air	AQS - Acetaldehyde	Ambient concentration monitoring data for acetaldehyde made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
93	Air	AQS - Acetonitrile	Ambient concentration monitoring data for acetonitrile made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
94	Air	AQS - Acrolein	Ambient concentration monitoring data for acrolein made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
95	Air	AQS - Acrylonitrile	Ambient concentration monitoring data for acrylonitrile made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
96	Air	AQS - Allyl Chloride	Ambient concentration monitoring data for allyl chloride made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
97	Air	AQS - Antimony Total Suspended Particulate Matter	Ambient concentration monitoring data for antimony made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
98	Air	AQS - Arsenic (PM <sub>10</sub> )	Ambient concentration monitoring data for arsenic (PM <sub>10</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
99	Air	AQS - Arsenic (PM <sub>2.5</sub> )	Ambient concentration monitoring data for arsenic (PM <sub>2.5</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
100	Air	AQS - Cadmium (PM <sub>10</sub> )	Ambient concentration monitoring data for cadmium (PM <sub>10</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
101	Air	AQS - Cadmium (PM <sub>2.5</sub> )	Ambient concentration monitoring data for cadmium (PM <sub>2.5</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
102	Air	AQS - Cadmium Total Suspended Particulate Matter	Ambient concentration monitoring data for cadmium total suspended particulate matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
103	Air	AQS - Carbon Disulfide	Ambient concentration monitoring data for carbon disulfide made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
104	Air	AQS - Carbon Tetrachloride	Ambient concentration monitoring data for carbon tetrachloride made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
105	Air	AQS - Chlorobenzene	Ambient concentration monitoring data for chlorobenzene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
106	Air	AQS - Chloroform	Ambient concentration monitoring data for chloroform made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
165	Air	AQS - Phenol	Ambient concentration monitoring data for phenol made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
166	Air	AQS -Phosphorous	Ambient concentration monitoring data for phosphorous made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
167	Air	AQS -Polycyclic Organic Matter	Ambient concentration monitoring data for polycyclic organic matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
107	Air	AQS - Chloroprene	Ambient concentration monitoring data for chloroprene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere



Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
108	Air	AQS - Chromium (PM <sub>10</sub> )	Ambient concentration monitoring data for chromium (PM <sub>10</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
109	Air	AQS - Chromium (PM <sub>2.5</sub> )	Ambient concentration monitoring data for chromium (PM <sub>2.5</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
110	Air	AQS - Chromium Total Suspended Particulate Matter	Ambient concentration monitoring data for chromium total suspended particulate matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
111	Air	AQS - Chromium VI Total Suspended Particulate Matter	Ambient concentration monitoring data for chromium VI total suspended particulate matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
112	Air	AQS - Cobalt Total Suspended Particulate Matter	Ambient concentration monitoring data for cobalt total suspended particulate matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
113	Air	AQS - o-Cresol	Ambient concentration monitoring data for o-cresol made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
114	Air	AQS - p-Cresol	Ambient concentration monitoring data for p-cresol made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
115	Air	AQS - Cumene	Ambient concentration monitoring data for cumene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
116	Air	AQS - Dibenzofurans	Ambient concentration monitoring data for dibenzofurans made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
117	Air	AQS - 1,4-Dichlorobenzene(p)	Ambient concentration monitoring data for 1,4-dichlorobenzene(p) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
118	Air	AQS - 3,3'-Dichlorobenzidene	Ambient concentration monitoring data for 3,3'-Dichlorobenzidene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
119	Air	AQS - Dichloroethyl ether (Bis[2-chloroethyl]ether)	Ambient concentration monitoring data for dichloroethyl ether (Bis[2-chloroethyl]ether) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
120	Air	AQS - 1,3-Dichloropropene	Ambient concentration monitoring data for 1,3-dichloropropene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
121	Air	AQS - 1,4-Dioxane	Ambient concentration monitoring data for 1,4-dioxane made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
122	Air	AQS - Ethyl Chloride (Chloroethane)	Ambient concentration monitoring data for ethyl chloride (chloroethane) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
123	Air	AQS - Ethylbenzene	Ambient concentration monitoring data for ethylbenzene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
124	Air	AQS - Ethylene Dibromide (Dibromoethane)	Ambient concentration monitoring data for ethylene dibromide (Dibromoethane) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
125	Air	AQS - Ethylene Dichloride (1,2-Dichloroethane)	Ambient concentration monitoring data for ethylene dichloride (1,2-Dichloroethane) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
126	Air	AQS - Ethylene Imine (Aziridine)	Ambient concentration monitoring data for ethylene imine (Aziridine) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
127	Air	AQS - Ethylene Dichloride (1,1-Dichloroethane)	Ambient concentration monitoring data for ethylene dichloride (1,1-Dichloroethane) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
128	Air	AQS - Formaldehyde	Ambient concentration monitoring data for formaldehyde made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
129	Air	AQS - Hexachlorobenzene	Ambient concentration monitoring data for hexachlorobenzene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
130	Air	AQS - Hexachlorobutadiene	Ambient concentration monitoring data for hexachlorobutadiene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
131	Air	AQS - Hexachlorocyclopentadiene	Ambient concentration monitoring data for hexachlorocyclopentadiene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
132	Air	AQS - Hexachloroethane	Ambient concentration monitoring data for hexachloroethane made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
133	Air	AQS - Hexane	Ambient concentration monitoring data for hexane made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
134	Air	AQS - Hydrochloric Acid	Ambient concentration monitoring data for hydrochloric acid made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
135	Air	AQS - Hydrogen Fluoride (Hydrofluoric Acid)	Ambient concentration monitoring data for hydrogen fluoride (Hydrofluoric acid) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
136	Air	AQS - Isophorone	Ambient concentration monitoring data for isophorone made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
137	Air	AQS - Lead (PM <sub>10</sub> )	Ambient concentration monitoring data for lead (PM <sub>10</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
138	Air	AQS - Lead (PM <sub>2.5</sub> )	Ambient concentration monitoring data for lead (PM <sub>2.5</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
139	Air	AQS - Lead Total Suspended Particulate Matter	Ambient concentration monitoring data for lead total suspended particulate matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
140	Air	AQS - Manganese (PM <sub>10</sub> )	Ambient concentration monitoring data for manganese (PM <sub>10</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
141	Air	AQS - Manganese (PM <sub>2.5</sub> )	Ambient concentration monitoring data for manganese (PM <sub>2.5</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
142	Air	AQS - Manganese Total Suspended Particulate Matter	Ambient concentration monitoring data for manganese total suspended particulate matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
143	Air	AQS - Mercury (PM <sub>10</sub> )	Ambient concentration monitoring data for mercury (PM <sub>10</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
144	Air	AQS - Mercury (PM <sub>2.5</sub> )	Ambient concentration monitoring data for mercury (PM <sub>2.5</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
145	Air	AQS - Mercury Total Suspended Particulate Matter	Ambient concentration monitoring data for mercury total suspended particulate matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
146	Air	AQS - Mercury Compounds	Ambient concentration monitoring data for mercury compounds made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
147	Air	AQS - Methanol	Ambient concentration monitoring data for methanol made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
148	Air	AQS - Methoxychlor	Ambient concentration monitoring data for methoxychlor made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
149	Air	AQS - Methyl Bromide (Bromomethane)	Ambient concentration monitoring data for methyl bromide (bromomethane) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
150	Air	AQS - Methyl Chloride (Chloromethane)	Ambient concentration monitoring data for methyl chloride (chloromethane) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
151	Air	AQS - Methyl Chloroform (1,1,1-Trichloroethane)	Ambient concentration monitoring data for methyl chloroform (1,1,1-trichloroethane) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
152	Air	AQS - Methyl Ethyl Ketone (2-Butanone)	Ambient concentration monitoring data for methyl ethyl ketone (2-butanone) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
153	Air	AQS - Methyl Iodide (Iodomethane)	Ambient concentration monitoring data for methyl iodide (iodomethane) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
154	Air	AQS - Methyl Isobutyl ketone (Hexone)	Ambient concentration monitoring data for methyl isobutyl ketone (hexone) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
155	Air	AQS - Methyl Methacrylate	Ambient concentration monitoring data for methyl methacrylate made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
156	Air	AQS - Methyl Tert-Butyl Ether	Ambient concentration monitoring data for methyl tert-butyl ether made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
157	Air	AQS - Methylene Chloride (Dichloromethane)	Ambient concentration monitoring data for methylene chloride (dichloromethane) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
158	Air	AQS - Naphthalene	Ambient concentration monitoring data for naphthalene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
159	Air	AQS - Nickel (PM <sub>10</sub> )	Ambient concentration monitoring data for nickel (PM <sub>10</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
160	Air	AQS - Nickel (PM <sub>2.5</sub> )	Ambient concentration monitoring data for nickel (PM <sub>2.5</sub> ) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
161	Air	AQS - Nickel Total Suspended Particulate Matter	Ambient concentration monitoring data for nickel total suspended particulate matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
162	Air	AQS - N-Nitrosodimethylamine	Ambient concentration monitoring data for n-nitrosodimethylamine made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
163	Air	AQS -Pentachloronitrobenzene (Quintobenzene)	Ambient concentration monitoring data for pentachloronitrobenzene (quintobenzene) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
164	Air	AQS -Pentachlorophenol	Ambient concentration monitoring data for pentachlorophenol made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
168	Air	AQS -Propionaldehyde	Ambient concentration monitoring data for propionaldehyde made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
169	Air	AQS -Propylene Dichloride (1,2-Dichloropropane)	Ambient concentration monitoring data for propylene dichloride (1,2-dichloropropane) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
170	Air	AQS -Selenium Total Suspended Particulate Matter	Ambient concentration monitoring data for selenium total suspended particulate matter made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
171	Air	AQS -Styrene	Ambient concentration monitoring data for styrene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
172	Air	AQS -2,3,7,8-Tetrachlorodibenzo-p-dioxin	Ambient concentration monitoring data for 2,3,7,8-tetrachlorodibenzo-p-dioxin made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
173	Air	AQS -1,1,2,2-Tetrachloroethane	Ambient concentration monitoring data for 1,1,2,2-tetrachloroethane made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
174	Air	AQS -Tetrachloroethylene (Perchloroethylene)	Ambient concentration monitoring data for tetrachloroethylene (perchloroethylene)made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
175	Air	AQS -Toluene	Ambient concentration monitoring data for toluene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
176	Air	AQS -o-Toluidine	Ambient concentration monitoring data for o-toluidine made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
177	Air	AQS - 1,2,4-Trichlorobenzene	Ambient concentration monitoring data for 1,2,4-trichlorobenzene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
178	Air	AQS - 1,1,2-Trichloroethane	Ambient concentration monitoring data for 1,1,2-trichloroethane made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
179	Air	AQS - Trichloroethylene	Ambient concentration monitoring data for trichloroethylene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere



**Air Domain**

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
180	Air	AQS - 2,2,4-Trimethylpentane	Ambient concentration monitoring data for 2,2,4-trimethylpentane made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
181	Air	AQS - Vinyl Acetate	Ambient concentration monitoring data for vinyl acetate made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
182	Air	AQS - Vinyl Chloride	Ambient concentration monitoring data for vinyl chloride made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
183	Air	AQS - Vinylidene Chloride (1,1-Dichloroethylene)	Ambient concentration monitoring data for vinylidene chloride (1,1-Dichloroethylene) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
184	Air	AQS - m-Xylene	Ambient concentration monitoring data for m-xylene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
185	Air	AQS - o-Xylene	Ambient concentration monitoring data for o-xylene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
186	Air	AQS - p-Xylene	Ambient concentration monitoring data for p-xylene made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
187	Air	AQS - Xylenes (mixed isomers)	Ambient concentration monitoring data for xylenes (mixed isomers) made available by AQS.	EPA	EPA	conterminous US, AK, HI, Puerto Rico	site - monitor	not applicable	No	Represented elsewhere
329	Air	IMPROVE -Fine Ammonium Sulfate (calculated)	Fine ammonium sulfate concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
330	Air	IMPROVE -Fine Ammonium Sulfate Extinction (calculated)	Fine ammonium sulfate extinction concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
331	Air	IMPROVE -Fine Elemental Carbon Extinction (calculated)	Fine elemental carbon extinction: concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
332	Air	IMPROVE -Fine Ammonium Nitrate (calculated)	Fine ammonium nitrate concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
333	Air	IMPROVE -Fine Ammonium Nitrate Extinction (calculated)	Fine ammonium nitrate extinction concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
334	Air	IMPROVE -Fine Organic carbon Extinction (calculated)	Fine organic carbon extinction concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
335	Air	IMPROVE -Fine Soil Concentration (calculated)	Fine soil concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere

**Air Domain**

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
337	Air	IMPROVE - Fine Aluminum Concentration	Fine aluminum concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
338	Air	IMPROVE -Fine Arsenic Concentration	Fine arsenic concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
339	Air	IMPROVE -Fine Bromine Concentration	Fine bromine concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
340	Air	IMPROVE -Fine Calcium Concentration	Fine calcium concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
341	Air	IMPROVE -Fine Chloride Concentration	Fine chloride concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
342	Air	IMPROVE -Fine Chlorine Concentration	Fine chlorine concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
343	Air	IMPROVE -Fine Chromium Concentration	Fine chromium concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
344	Air	IMPROVE -Fine Copper Concentration	Fine copper concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
345	Air	IMPROVE -Fine Iron Concentration	Fine iron concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
346	Air	IMPROVE -Fine Hydrogen Concentration	Fine hydrogen concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
347	Air	IMPROVE -Fine Potassium Concentration	Fine potassium concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
348	Air	IMPROVE -Fine Magnesium Concentration	Fine magnesium concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
349	Air	IMPROVE -Fine Manganese Concentration	Fine manganese concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
350	Air	IMPROVE -Fine Molybdenum Concentration	Fine molybdenum concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
351	Air	IMPROVE -Fine Nitrite Concentration	Fine nitrite concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
352	Air	IMPROVE -Fine Sodium Concentration	Fine sodium concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
353	Air	IMPROVE -Fine Ammonium Ion Concentration	Fine ammonium ion concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
354	Air	IMPROVE -Fine Nickel Concentration	Fine nickel concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
355	Air	IMPROVE -Fine Nitrate Concentration	Fine nitrate concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
356	Air	IMPROVE -Fine Organic Carbon Concentration	Fine organic carbon concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
357	Air	IMPROVE -Fine Phosphorus Concentration	Fine phosphorus concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
358	Air	IMPROVE -Fine Lead Concentration	Fine lead concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
359	Air	IMPROVE -Fine Rubidium Concentration	Fine rubidium concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
360	Air	IMPROVE -Fine Sulfur Concentration	Fine sulfur concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
361	Air	IMPROVE -Fine Selenium Concentration	Fine selenium concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
362	Air	IMPROVE -Fine Silicon Concentration	Fine silicon concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
363	Air	IMPROVE -Fine Sulfate Concentration	Fine sulfate concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
364	Air	IMPROVE -Fine Strontium Concentration	Fine strontium concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
365	Air	IMPROVE -Fine Titanium Concentration	Fine titanium concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
366	Air	IMPROVE -Fine Vanadium Concentration	Fine vanadium concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
367	Air	IMPROVE -Fine Zinc Concentration	Fine zinc concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
368	Air	IMPROVE -Fine Zirconium Concentration	Fine zirconium concentration from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.	INTERAGENCY	Colorado State	conterminous US, AK and HI	point	not applicable	No	Represented elsewhere
188	Air	CASTNET - Hourly Ozone Data 1-hr	Hourly ozone data from the CASTNET network in .csv format.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere
189	Air	CASTNET - Weekly Ambient Concentrations	Weekly ambient concentrations of SO <sub>2</sub> and HNO <sub>3</sub> gases, and SO <sub>4</sub> , NO <sub>3</sub> , NH <sub>4</sub> and base cation concentrations for particles as measured by open-face filter packs.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere
190	Air	CASTNET - Summary Weekly Ambient Concentrations	Weekly summaries of ambient concentrations of SO <sub>2</sub> and HNO <sub>3</sub> gases, and SO <sub>4</sub> , NO <sub>3</sub> , NH <sub>4</sub> and base cation concentrations for particles as measured by open-face filter packs.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere
191	Air	CASTNET - Hourly Gas Values 2008 and 2009	Hourly SO <sub>2</sub> , NO <sub>y</sub> and CO values as measured by gas analyzers.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere
192	Air	CASTNET - Deposition and Concentration Model Output	Multi Layer Model (MLM) output providing hourly estimates for concentration, dry deposition velocity, and dry deposition flux for O <sub>3</sub> , SO <sub>2</sub> , NH <sub>3</sub> , PM, SO <sub>4</sub> , NO <sub>3</sub> , NH <sub>4</sub> , CA, MG, NA, K, CL.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere
193	Air	CASTNET - Daily Maximum Ozone 8-hour	Daily maximum of rolling 8-hour average ambient concentration, calculated according to 40CFR Part58, per station.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere
194	Air	CASTNET - Total Deposition	Total annual deposition at CASTNET sites using MODEL_OUTPUT_ANNUAL as the source of dry deposition and WETDEP (interpolated NADP/NTN) as the source of wet deposition.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere
195	Air	CASTNET - Chemical Speciation Concentration Data	Chemical speciation concentration data from aerosol filter packs at local conditions from October 1993 to December 2001. This table is no longer updated.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere
196	Air	CASTNET - Nephelometer Data	Nephelometer data (conforms to Interagency Monitoring of Protected Visual Environments (IMPROVE) network standards) from October 1993 to June 2002. This table is no longer updated.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere
197	Air	CASTNET - Hourly Ozone Values 8-hour	8-hr maximum ozone data from the CASTNET network in .csv format.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere



Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
198	Air	CASTNET - Daily ozone data - 1- and 8-hr max	daily 1- and 8-hr maximum ozone values from CASTNET network in .csv format.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere
199	Air	CASTNET - Weekly Wet Deposition Concentrations	Weekly wet deposition concentrations and sampling information from January 1989 - February 1999. This table is no longer updated.	EPA	EPA	conterminous US	not applicable	not applicable	No	Represented elsewhere
369	Air	NADP - Total Deposition - monthly	Total atmospheric deposition (kg/Ha) and precipitation-weighted mean concentrations of the following species as monitored by the National Atmospheric Deposition Program - Ca, Mg, K, Na, NH4, NO3, Inorganic N, CL, SO4, H+ (lab), H+ (field).	NADP	NADP	conterminous US, AK, HI, Puerto Rico, Virgin Islands and American Samoa	station - point	not applicable	No	Represented elsewhere
370	Air	NADP - Total Deposition - seasonal	Total atmospheric deposition (kg/Ha) and precipitation-weighted mean concentrations of the following species as monitored by the National Atmospheric Deposition Program - Ca, Mg, K, Na, NH4, NO3, Inorganic N, CL, SO4, H+ (lab), H+ (field).	NADP	NADP	conterminous US, AK, HI, Puerto Rico, Virgin Islands and American Samoa	station - point	not applicable	No	Represented elsewhere
371	Air	NADP - Total Deposition -annual	Total atmospheric deposition (kg/Ha) and precipitation-weighted mean concentrations of the following species as monitored by the National Atmospheric Deposition Program - Ca, Mg, K, Na, NH4, NO3, Inorganic N, CL, SO4, H+ (lab), H+ (field).	NADP	NADP	conterminous US, AK, HI, Puerto Rico, Virgin Islands and American Samoa	station - point	not applicable	No	Represented elsewhere
372	Air	NADP - Total Deposition - weekly	Total atmospheric deposition (kg/Ha) and precipitation-weighted mean concentrations of the following species as monitored by the National Atmospheric Deposition Program - Ca, Mg, K, Na, NH4, NO3, Inorganic N, CL, SO4, H+ (lab), H+ (field).	NADP	NADP	conterminous US, AK, HI, Puerto Rico, Virgin Islands and American Samoa	station - point	not applicable	No	Represented elsewhere
EMISSIONS DATA										
1	Air	Smoke Emissions	Emissions data from portable smoke detectors.	USFS, USFWS, NPS, BLM	USFS, USFWS, NPS, BLM	some western and southern states: CA, ID, MT, AZ, CO, TX, MS, FL	not applicable	not applicable	No	Non-informative
16	Air	Daily CO2, SO2, and NOX Emissions (annual)	Daily CO2, SO2, and NOX emissions data for multiple states provided by state as an annual file.	EPA	EPA	statewide for multiple states	not sure if it's point or state	not applicable	No	Spatial coverage
17	Air	Daily CO2, SO2, and NOX Emissions (quarterly)	Daily CO2, SO2, and NOX emissions data for multiple states provided by state as quarterly files.	EPA	EPA	statewide for multiple states	not sure if it's point or state	not applicable	No	Spatial coverage
18	Air	Hourly CO2, SO2, and NOX Emissions	Hourly CO2, SO2, and NOX emissions data for multiple states provided by state as monthly files.	EPA	EPA	statewide for multiple states	not sure if it's point or state	not applicable	No	Spatial coverage
19	Air	Hourly CO2, SO2, and NOX Emissions (quarterly)	Hourly CO2, SO2, and NOX emissions data for multiple states provided by state as quarterly files.	EPA	EPA	statewide for multiple states	not sure if it's point or state	not applicable	No	Spatial coverage
373	Air	NATA 1996 Emissions	1996 National Air Toxics Assessment emissions of 32 toxics plus diesel PM data listed by county.	EPA	EPA	conterminous US and Puerto Rico	county	county	No	Temporal coverage

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
376	Air	NATA 1999 Air Toxics Emissions	1999 National Air Toxics Assessment emissions of 177 toxics plus diesel PM data listed by county.	EPA	EPA	conterminous US, AK, HI and Puerto Rico	county	county	No	Represented elsewhere
386	Air	NEI - Facility Summary	Facility-level summary of all point sources, both CAPs and HAPs, as found in the 2002 NEI Final v3 file.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and Gulf of Mexico	not applicable	not applicable	No	Non-informative
387	Air	NEI - Point SCC Summary for CAP and HAP	Source classification code summary for both criteria air pollutants (CAP) and hazardous air pollutants (HAP) at county, state and national level.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and Gulf of Mexico	not applicable	not applicable	No	Non-informative
388	Air	NEI - Hazardous Air Pollutants	Emissions data summarized by point stack for hazardous air pollutants (HAP).	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and Gulf of Mexico	not applicable	not applicable	No	Non-informative
389	Air	NEI - Criteria Air Pollutants	Emissions data summarized by point stack for criteria air pollutants (CAP).	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and Gulf of Mexico	not applicable	not applicable	No	Non-informative
390	Air	NEI - Nonpoint Summary	Nonpoint source data for criteria air pollutants (CAP) and hazardous air pollutants (HAP) at national, state and county level.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and Gulf of Mexico	not applicable	not applicable	No	Non-informative
391	Air	NEI - Nonroad County	Mobile source emissions data for trains, aircraft and marine vessels aggregated to county level. Also available at state and national scale.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and Gulf of Mexico	not applicable	not applicable	No	Non-informative
392	Air	NEI - Onroad County	Mobile source emissions data for automobiles aggregated to county level. Also available at state and national scale.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands	not applicable	not applicable	No	Non-informative
393	Air	NEI - Tier Summaries	Emissions data for criteria air pollutants (CAP) from NEI summarized by county, state and national scale.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and Gulf of Mexico	not applicable	not applicable	No	Non-informative
394	Air	NEI - 42 Category Summaries	Emissions data for criteria air pollutants (CAP) and hazardous air pollutants (HAP) from NEI summarized by county, state and national scale.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and Gulf of Mexico	not applicable	not applicable	No	Non-informative
395	Air	NEI - Biogenic Sector Data 2002/2005	This spreadsheet contains county-total estimates of 2002 and 2005 biogenic emissions based on the BEIS3.12 model.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and Gulf of Mexico	not applicable	not applicable	No	Non-informative
396	Air	NEI - 1970 - 2008 Average Annual Emissions	National-scale, yearly emissions totals for all criteria pollutants provided by National Emissions Inventory.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and Gulf of Mexico	US	not applicable	No	Represented elsewhere

## Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
397	Air	NEI - PM <sub>2.5</sub> Filterable and PM <sub>10</sub> Filterable Emissions Trends	PM <sub>2.5</sub> Filterable and PM <sub>10</sub> Filterable emissions trends for Electric Generating Utilities for 1970 to 2005.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands and Gulf of Mexico	US	not applicable	No	Non-informative

## MISCELLANEOUS

2	Air	Ambient Monitoring Data Analysis System (AMDAS)	This tool can be downloaded to access air quality data. It was designed to work with EPA's AQS.	not available	not available	not applicable	not applicable	not applicable	No	Non-informative
3	Air	Air Quality Images	Web-cam air quality imagery from select locations in the US.	USFS	USFS	conterminous US	not applicable	not applicable	No	Non-informative
12	Air	2001-2003 Air Monitoring Stations - California	All California active air monitoring stations from 2001 - 2003.	CEPA	CEPA	CA	point	not applicable	No	Non-informative
13	Air	2002-2004 Air Monitoring Stations	All California active air monitoring stations from 2002 - 2004.	CEPA	CEPA	CA	point	not applicable	No	Non-informative
15	Air	Site-Level Data for Various NAAQS Metrics - lead	One of a series of Excel spreadsheets that contains site level statistics for National Ambient Air Quality Standards (NAAQS) metrics.	EPA	EPA	conterminous US	not applicable	not applicable	No	Non-informative
20	Air	Acid Rain Averaging Plan	Acid Rain NOx Program Rate-Based Compliance for Averaging Plans.	EPA	EPA	incomplete national coverage - AL, FL, GA, IA, IL, IN, KY, MD, MN, MO, MS, NY, OH, PA, TN, WI, WV	point	not applicable	No	Non-informative
21	Air	Acid Rain Compliance	Acid Rain NOx Program Rate-Based Compliance data.	EPA	EPA	incomplete national coverage - AL, FL, GA, IA, IL, IN, KS, KY, MA, MD, MI, MN, MO, MS, NH, NJ, NY, OH, PA, TN, UT, WI, WV, WY	point	not applicable	No	Non-informative
22	Air	Acid Rain NOx Compliance	Acid Rain NOx Program Rate-Based Compliance data.	EPA	EPA	incomplete national coverage - AL, FL, GA, IA, IL, IN, KS, KY, MD, MI, MN, MO, MS, NY, OH, PA, TN, UT, WI, WV, WY	not applicable	not applicable	No	Non-informative
23	Air	National Budget Trading Program	National Budget Trading Program data.	EPA	EPA	eastern US - States included are: AL, CT, DC, DE, IL, IN, KY, MA, MD, MI, NC, NJ, NY, OH, PA, RI, SC, TN, VA, WV	point	not applicable	No	Non-informative
24	Air	Compliance Ozone Transport Commission (OTC)	OTC NOx Budget Program Annual Reconciliation data.	EPA	EPA	some northeastern states - CT, DC, DE, MA, MD, NH, NJ, NY, PA, RI	point	not applicable	No	Non-informative

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
54	Air	Consolidated Human Activity Database (CHAD)	CHAD is a master database providing access to other human activity databases using a consistent format. CHAD facilitates access and retrieval of activity/and questionnaire information from those databases that EPA currently has access to-and-uses-in its various regulatory analyses undertaken by program offices.	EPA	EPA	few cities and schools around the country	not applicable	not applicable	No	Non-informative
55	Air	Human Exposure Database System (HEDS)	Human Exposure database System (HEDS) is a web-enabled data repository for human exposure studies. Its mission is to provide data sets, documents, and metadata for human exposure studies that can be easily accessed and understood by a diverse set of users.	not available	not available	not available	not applicable	not applicable	No	Non-informative
MODELED DATA										
200	Air	CMAQ - Acetaldehyde (ALD2)	36km gridded, predicted acetaldehyde data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ). Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
201	Air	CMAQ - Aldehyde Dehydrogenase (ALDX)	36km gridded, predicted acetaldehyde dehydrogenase data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
202	Air	CMAQ - Carbon Monoxide (CQ)	36km gridded, predicted carbon data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
203	Air	CMAQ - Ethene (ETH)	36km gridded, predicted ethene data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
204	Air	CMAQ - Ethane (ETHA)	36km gridded, predicted ethane data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
205	Air	CMAQ - Formaldehyde (FQRM)	36km gridded, predicted formaldehyde data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere



## Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
206	Air	CMAQ - Hydrogen Peroxide (H2O2)	36km gridded, predicted hydrogen peroxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
207	Air	CMAQ - Nitrous Acid (HONO)	36km gridded, predicted nitrous acid data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
208	Air	CMAQ - Odd Hydrogen (HOX)	36km gridded, predicted odd hydrogen data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
209	Air	CMAQ - Internal Olefins (IOLE)	36km gridded, predicted internal olefins data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
210	Air	CMAQ - Isoprene (ISOP)	36km gridded, predicted isoprene data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
211	Air	CMAQ - Dinitrogen Pentoxide (N2O5)	36km gridded, predicted dinitrogen pentoxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
212	Air	CMAQ - Ammonia (NH3)	36km gridded, predicted ammonia pentoxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
213	Air	CMAQ - Ammonia (NH3) $\mu\text{g}/\text{m}^3$	36km gridded, predicted ammonia data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
214	Air	CMAQ - Total Ammonium (NHX) $\mu\text{g}/\text{m}^3$	36km gridded, predicted total ammonium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
215	Air	CMAQ - Nitric Oxide (NO)	36km gridded, predicted nitric oxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
216	Air	CMAQ - Total Reactive Nitrogen (NOY)	36km gridded, predicted total reactive nitrogen data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
217	Air	CMAQ - Nitrogen (NTR)	36km gridded, predicted nitrogen data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
218	Air	CMAQ - Coarse Mode Nitrate	36km gridded, predicted coarse mode nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
219	Air	CMAQ - Fine Particulate Organic Carbon	36km gridded, predicted fine particulate organic carbon data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
220	Air	CMAQ - Anthropogenic Aerosol (fine)	36km gridded, predicted anthropogenic aerosol data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
221	Air	CMAQ - Biogenic Aerosol (fine)	36km gridded, predicted biogenic aerosol data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
222	Air	CMAQ - Cloud Aerosol (fine)	36km gridded, predicted cloud aerosol data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
223	Air	CMAQ - Primary Anthropogenic Aerosol (fine)	36km gridded, predicted primary anthropogenic aerosol data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
224	Air	CMAQ - Other Aerosol (fine)	36km gridded, predicted other aerosol data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
225	Air	CMAQ - Fine Particulate Sulfate	36km gridded, predicted fine particulate sulfate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
226	Air	CMAQ - Coarse Mode Sulfate	36km gridded, predicted coarse mode sulfate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
227	Air	CMAQ - Total Fine Particulate Mass	36km gridded, predicted total fine particulate mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
228	Air	CMAQ - Fine Particulate Chloride	36km gridded, predicted fine particulate chloride data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
229	Air	CMAQ - Fine Particulate Elemental Carbon	36km gridded, predicted fine particulate elemental carbon data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
230	Air	CMAQ - Fine Particulate Sodium	36km gridded, predicted fine particulate sodium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
231	Air	CMAQ - Fine Particulate Ammonium	36km gridded, predicted fine particulate ammonium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
232	Air	CMAQ - Fine Particulate Nitrate	36km gridded, predicted Fine particulate nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
233	Air	CMAQ - Fine Particulate Organic Carbon	36km gridded, predicted fine particulate organic carbon data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
234	Air	CMAQ - Other Fine Particulate Mass	36km gridded, predicted other fine particulate mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
235	Air	CMAQ - Fine Particulate Sulfate	36km gridded, predicted fine particulate sulfate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
236	Air	CMAQ - Total Fine Particulate Mass	36km gridded, predicted total fine particulate mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
237	Air	CMAQ - Course Chloride	36km gridded, predicted course chloride data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
238	Air	CMAQ - Course Sodium	36km gridded, predicted course sodium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
239	Air	CMAQ - Course Ammonium	36km gridded, predicted course ammonium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
240	Air	CMAQ - Course Nitrate	36km gridded, predicted course nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
241	Air	CMAQ - Other Course Mass	36km gridded, predicted other course mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere



## Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
242	Air	CMAQ - Course Sulfate	36km gridded, predicted course sulfate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
243	Air	CMAQ - Total Course mass	36km gridded, predicted total course mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
244	Air	CMAQ - Total Nitrate (nitrate + nitric acid)	36km gridded, predicted total nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
245	Air	CMAQ - Nitric Acid ( $\text{HNO}_3$ )	36km gridded, predicted nitric acid data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
246	Air	CMAQ - Nitric Acid $\mu\text{g}/\text{m}^3$ ( $\text{HNO}_3$ )	36km gridded, predicted nitric acid data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
247	Air	CMAQ - Ozone ( $\text{O}_3$ )	36km gridded, predicted ozone data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
248	Air	CMAQ - Olefins (OLE)	36km gridded, predicted olefins data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
249	Air	CMAQ - Paraffin (PAR)	36km gridded, predicted paraffin data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
250	Air	CMAQ - Peroxyacetyl Nitrate (PAN)	36km gridded, predicted peroxyacetyl nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere

# Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
251	Air	CMAQ - C3 and Peroxyacetyl Nitrate (PANX)	36km gridded, predicted c3 and peroxyacetyl nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
252	Air	CMAQ - Sulfur Dioxide (SO2)	36km gridded, predicted sulfur dioxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
253	Air	CMAQ - Sulfur Dioxide $\mu\text{g}/\text{m}^3$ (SO <sub>2</sub> )	36km gridded, predicted sulfur dioxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
254	Air	CMAQ - Sulfur (SULF)	36km gridded, predicted sulfur data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
255	Air	CMAQ - Terpene (TERP)	36km gridded, predicted terpene data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
256	Air	CMAQ - Toluene (TOL)	36km gridded, predicted toluene data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
257	Air	CMAQ - Volatile Organic Compounds (VOC)	36km gridded, predicted volatile organic compound data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
258	Air	CMAQ - Xylene (XYL)	36km gridded, predicted xylene data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
259	Air	CMAQ - Fine Particulate Chloride (ACLII)	36km gridded, predicted fine particulate chloride data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere

## Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
260	Air	CMAQ - Total Coarse Mode Mass	36km gridded, predicted total coarse mode mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
261	Air	CMAQ - Fine Particulate Elemental Carbon	36km gridded, predicted fine particulate elemental Carbon data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
262	Air	CMAQ - Fine Particulate Sodium	36km gridded, predicted fine particulate sodium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
263	Air	CMAQ - Fine Particulate Nitrate	36km gridded, predicted fine particulate nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
264	Air	CMAQ - Fine Particulate Ammonium	36km gridded, predicted fine particulate ammonium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	conterminous US	36km cell	36km	No	Represented elsewhere
265	Air	CMAQ - Acetaldehyde (ALD2)	12km gridded, predicted acetaldehyde data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ). Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
266	Air	CMAQ - aldehyde Dehydrogenase (ALDX)	12km gridded, predicted acetaldehyde dehydrogenase data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
267	Air	CMAQ - Carbon Monoxide (CO)	12km gridded, predicted carbon monoxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
268	Air	CMAQ - Ethene (ETH)	12km gridded, predicted ethene data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere

# Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
269	Air	CMAQ - Ethane (ETHA)	12km gridded, predicted ethane data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
270	Air	CMAQ - Formaldehyde (FORM)	12km gridded, predicted formaldehyde data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
271	Air	CMAQ - Hydrogen Peroxide (H2O2)	12km gridded, predicted hydrogen peroxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
272	Air	CMAQ - Nitric Acid (HNQ3)	12km gridded, predicted nitric acid data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
273	Air	CMAQ - Nitric Acid $\mu\text{g}/\text{m}^3$ (HNO3)	12km gridded, predicted nitric acid data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
274	Air	CMAQ - Nitrous Acid (HONO)	12km gridded, predicted nitrous acid data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
275	Air	CMAQ - Odd Hydrogen (HQX)	12km gridded, predicted odd hydrogen data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Non-informative
276	Air	CMAQ - Internal Olefins (IOLE)	12km gridded, predicted internal olefins data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Non-informative
277	Air	CMAQ - Isoprene (ISOP)	12km gridded, predicted isoprene data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere



Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
278	Air	CMAQ - Dinitrogen Pentoxide (N2O5)	12km gridded, predicted dinitrogen pentoxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
279	Air	CMAQ - Ammonia (NH <sup>3</sup> )	12km gridded, predicted ammonia pentoxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
280	Air	CMAQ - Ammonia (NH <sup>3</sup> ) µg/m <sup>3</sup>	12km gridded, predicted ammonia data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of µg/m <sup>3</sup> . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
281	Air	CMAQ - Total Ammonium (NH <sub>4</sub> )µg/m <sup>3</sup>	12km gridded, predicted total ammonium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
282	Air	CMAQ - Nitric Oxide (NO)	12km gridded, predicted nitric oxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
283	Air	CMAQ - Total Reactive Nitrogen (NO <sub>y</sub> )	12km gridded, predicted total reactive nitrogen data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
284	Air	CMAQ - Nitrogen (NTR)	12km gridded, predicted nitrogen data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
285	Air	CMAQ - Ozone (O <sub>3</sub> )	12km gridded, predicted ozone data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
286	Air	CMAQ - Olefins (OLE)	12km gridded, predicted olefins data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Non-informative

## Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
287	Air	CMAQ - Paraffin (PAR)	12km gridded, predicted paraffin data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Non-informative
288	Air	CMAQ - Peroxyacetyl Nitrate (PAN)	12km gridded, predicted peroxyacetyl nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Non-informative
289	Air	CMAQ - C3 and Peroxyacetyl Nitrate (PANX)	12km gridded, predicted C3 and peroxyacetyl nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Non-informative
290	Air	CMAQ - Sulfur Dioxide (SO2)	12km gridded, predicted sulfur dioxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
291	Air	CMAQ - Total Nitrate (nitrate + nitric acid)	12km gridded, predicted total nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of µg/m³. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
292	Air	CMAQ - Sulfur Dioxide µg/m³ (SO₂)	12km gridded, predicted sulfur dioxide data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of µg/m³. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
293	Air	CMAQ - Sulfur (SULF)	12km gridded, predicted sulfur data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
294	Air	CMAQ - Terpene (TERP)	12km gridded, predicted terpene data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Non-informative
295	Air	CMAQ - Toluene (TOL)	12km gridded, predicted toluene data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere

## Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
296	Air	CMAQ - Volatile Organic Compounds (VOC)	12km gridded, predicted volatile organic compounds data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
297	Air	CMAQ - Xylene (XYL)	12km gridded, predicted xylene data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of ppb. Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
298	Air	CMAQ - Fine Particulate Cchloride (ACLIJ)	12km gridded, predicted fine particulate chloride data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
299	Air	CMAQ - Total Coarse Mode Mass	12km gridded, predicted total coarse mode mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
300	Air	CMAQ - Fine Particulate Elemental Carbon	12km gridded, predicted fine particulate elemental Carbon data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
301	Air	CMAQ - Fine Particulate Sodium	12km gridded, predicted fine particulate sodium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere

Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
302	Air	CMAQ - Fine Particulate Nitrate	12km gridded, predicted fine particulate nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
303	Air	CMAQ - Fine Particulate Ammonium	12km gridded, predicted fine particulate ammonium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
304	Air	CMAQ - Coarse Mode Nitrate	12km gridded, predicted coarse mode nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
305	Air	CMAQ - Fine Particulate Organic Carbon	12km gridded, predicted fine particulate organic carbon data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
306	Air	CMAQ - Anthropogenic Aerosol (fine)	12km gridded, predicted anthropogenic aerosol data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
307	Air	CMAQ - Biogenic Aerosol (fine)	12km gridded, predicted biogenic aerosol data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere



## Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
308	Air	CMAQ - Cloud Aerosol (fine)	12km gridded, predicted cloud aerosol data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
309	Air	CMAQ - Primary Anthropogenic Aerosol (fine)	12km gridded, predicted primary anthropogenic aerosol data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
310	Air	CMAQ - Other Aerosol (fine)	12km gridded, predicted other aerosol data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
311	Air	CMAQ - Fine Particulate Sulfate	12km gridded, predicted fine particulate sulfate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
312	Air	CMAQ - Coarse Mode Sulfate	12km gridded, predicted coarse mode sulfate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
313	Air	CMAQ - Total Fine Particulate Mass	12km gridded, predicted total fine particulate mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere

## Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
314	Air	CMAQ - Fine Particulate Chloride	12km gridded, predicted fine particulate chloride data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
315	Air	CMAQ - Fine Particulate Elemental Carbon	12km gridded, predicted fine particulate elemental carbon data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
316	Air	CMAQ - Fine Particulate Sodium	12km gridded, predicted fine particulate sodium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
317	Air	CMAQ - Fine Particulate Ammonium	12km gridded, predicted fine particulate ammonium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
318	Air	CMAQ - Fine Particulate Nitrate	12km gridded, predicted Fine particulate nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
319	Air	CMAQ - Fine Particulate Organic Carbon	12km gridded, predicted fine particulate organic carbon data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
320	Air	CMAQ - Other Fine Particulate Mass	12km gridded, predicted other fine particulate mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
321	Air	CMAQ - Fine Particulate Sulfate	12km gridded, predicted fine particulate sulfate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
322	Air	CMAQ - Total Fine Particulate Mass	12km gridded, predicted total fine particulate mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
323	Air	CMAQ - Course Chloride	12km gridded, predicted course chloride data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
324	Air	CMAQ - Course Sodium	12km gridded, predicted course sodium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
325	Air	CMAQ - Course Ammonium	12km gridded, predicted course ammonium data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
326	Air	CMAQ - Course Nitrate	12km gridded, predicted course nitrate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
327	Air	CMAQ - Other Course Mass	12km gridded, predicted other course mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
328	Air	CMAQ - Course Sulfate	12km gridded, predicted course sulfate data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
336	Air	CMAQ - Total Course Mass	12km gridded, predicted total course mass data produced by Community Multi-Scale Atmospheric Quality Model (CMAQ), expressed in units of $\mu\text{g}/\text{m}^3$ . Available as hourly, daily average and monthly average.	EPA	EPA	eastern US - from roughly central TX (~100W longitude) eastward	12km cell	12km	No	Represented elsewhere
374	Air	NATA 1996 Ambient Concentrations	1996 National Air Toxics Assessment ambient concentrations ( $\mu\text{g}/\text{m}^3$ ) of 32 toxics plus diesel PM data listed by county.	EPA	EPA	conterminous US and Puerto Rico	county	county	No	Temporal coverage
375	Air	NATA 1996 Exposure Concentrations	1996 National Air Toxics Assessment exposure concentration distributions of 32 toxics plus diesel PM data listed by county.	EPA	EPA	conterminous US and Puerto Rico	county	county	No	Temporal coverage

Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
377	Air	NATA 1999 Air Toxics Modeled Ambient Concentrations	1999 National Air Toxics Assessment ambient concentrations of 177 toxics plus diesel PM data listed by county. Estimates created using ASPEN model.	EPA	EPA	conterminous US, AK, HI and Puerto Rico	county	county	Yes	N/A
		NATA 2002 Air Toxics Modeled Ambient Concentrations							Yes	N/A
		NATA 2005 Air Toxics Modeled Ambient Concentrations							Yes	N/A
378	Air	NATA 1999 County Level Cancer Risk	1999 National Air Toxics Assessment percentile distribution of risk across census tracts, and contribution by source sector to the average risk for each county in the U.S.	EPA	EPA	conterminous US, AK, HI and Puerto Rico	county	county	No	Non-informative
379	Air	NATA 1999 County Level Neurological Risk	1999 National Air Toxics Assessment percentile distribution of risk across census tracts, and contribution by source sector to the average risk for each county in the U.S.	EPA	EPA	conterminous US, AK, HI and Puerto Rico	county	county	No	Non-informative
380	Air	NATA 1999 County Level Respiratory Risk	1999 National Air Toxics Assessment percentile distribution of risk across census tracts, and contribution by source sector to the average risk for each county in the U.S.	EPA	EPA	conterminous US, AK, HI and Puerto Rico	county	county	No	Non-informative
381	Air	NATA 1999 County Level Pollutant-Specific Cancer/Non Cancer Risk	1999 National Air Toxics Assessment percentile distribution of risk across census tracts, and contribution by source sector to the average risk for each county in the U.S. with the pollutant-specific contribution to the total risk.	EPA	EPA	conterminous US, AK, HI and Puerto Rico	county	county	No	Non-informative
382	Air	NATA 2002 State-specific Emission by County	Nationwide, pollutant-specific tons/year emissions for the year 2002 for every state (including Puerto Rico, the Virgin Islands, and the District of Columbia) and for every county in each state.	EPA	EPA	conterminous US, AK, HI, Puerto Rico and Virgin Islands	county	county	No	Represented elsewhere
383	Air	NATA 2002 US Neurological Risks County	EPA's 2002 national-scale assessment estimates across the United States plus Puerto Rico, the Virgin Islands, and the District of Columbia using 2002 national air toxics emission inventory as input to the air dispersion models ASPEN, and an inhalation exposure model (HAPEM5).	EPA	EPA	conterminous US, AK, HI, Puerto Rico and Virgin Islands	county	county	No	Non-informative
384	Air	NATA 2002 US Respiratory Risks County	EPA's 2002 national-scale assessment estimates across the United States plus Puerto Rico, the Virgin Islands, and the District of Columbia using 2002 national air toxics emission inventory as input to the air dispersion models ASPEN, and an inhalation exposure model (HAPEM5).	EPA	EPA	conterminous US, AK, HI, Puerto Rico and Virgin Islands	county	county	No	Non-informative



Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
385	Air	NATA 2002 US Cancer Risks County	EPA's 2002 national-scale assessment estimates across the United States plus Puerto Rico, the Virgin Islands, and the District of Columbia using 2002 national air toxics emission inventory as input to the air dispersion models ASPEN, and an inhalation exposure model (HAPEM5).	EPA	EPA	conterminous US, AK, HI, Puerto Rico and Virgin Islands	county	county	No	Non-informative
REMOTELY SENSED DATA										
25	Air	Total Ozone - Earth Probe/TOMS	Total ozone at ground pixel resolution from the Earth Probe/TOMS satellite system.	NASA	NASA	global	13 x 24 km	13 x 24km at nadir	No	Represented elsewhere
26	Air	Total Ozone - Aura/OMI	Total ozone at ground pixel resolution from the Aura/OMI satellite system.	NASA	NASA	global	13 x 24km	13 x 24km at nadir	No	Represented elsewhere
27	Air	Total Ozone - Nimbus-7/TOMS	Total ozone at ground pixel resolution from the Nimbus-7/TOMS satellite system.	NASA	NASA	global	13 x 24km	13 x 24km at nadir	No	Represented elsewhere
28	Air	Total Ozone - Aqua/AIRS	Total ozone at ground pixel resolution from the Aqua/AIRS satellite system.	NASA	NASA	global	13 x 24km	13 x 24km at nadir	No	Represented elsewhere
29	Air	Total Ozone Daily Average - Aura/OMI	Total ozone daily average at ground pixel resolution from the Aura/OMI satellite system.	NASA	NASA	global	1 degree	1 degree	No	Represented elsewhere
30	Air	Total Ozone - Aura/OMI	Total ozone at ground pixel resolution from the Aura/OMI satellite system.	NASA	NASA	global	.25 degree	.25 degree	No	Represented elsewhere
31	Air	Total Ozone daily averaged, globally gridded	Daily average, globally gridded ozone data from Nimbus-7/TOMS, EarthProbe/TOMS, and Meteor-3/TOMS	NASA	NASA	global	1 x 1.25 degrees	1 x 1.25 degrees	No	Represented elsewhere
32	Air	Total Ozone daily/weekly/monthly average	Daily/weekly/monthly average, globally gridded ozone data from Aqua/AIRS satellite system.	NASA	NASA	global	1 x 1.25 degrees	1 x 1.25 degrees	No	Represented elsewhere
33	Air	Nitric Oxide (NO) Profiles	Nitric oxide (NO) profiles (mixing ratios at different pressure levels) from UARS/HALOE platform, at pixel resolution.	NASA	NASA	global	4 degrees	4 degrees	No	Represented elsewhere
34	Air	Nitrous Oxide(N2O) Profiles	Nitrous oxide (NO) profiles (mixing ratios at different pressure levels) from Aura/MLS or Aura/HIRDLES platform							
35	Air	Nitrogen Dioxide (NO2) Profiles	Nitrogen dioxide (NO2) profiles (mixing ratios at different pressure levels) from Aura/HIRDLES (High Resolution Dynamics Limb Sounder) and UARS/HALOE (Upper Atmospheric Research Satellite)/(Halogen Occultation Experiment) platform, at pixel resolution.	NASA	NASA	global	5 degrees (500km)	5 degrees (500km)	No	Represented elsewhere
36	Air	Dinitrogen Pentoxide, N2O5 Profiles	Dinitrogen pentoxide(N2O5) profiles at ground pixel resolution from the Aura/HIRDLS (High Resolution Dynamics Limb Sounder) satellite platform, at pixel resolution.	NASA	NASA	global	5 degrees (500km)	5 degrees (500km)	No	Represented elsewhere

Air Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
37	Air	Nitric Acid, NHO3 Profiles	HNO3 Profiles at ground pixel resolution from the Aura/HIRDLS (High Resolution Dynamics Limb Sounder) satellite platform, at pixel resolution.	NASA	NASA	global	5 degrees (500km)	5 degrees (500km)	No	Represented elsewhere
38	Air	Total Column Abundance of Sulfur Dioxide (SO2)	SO2 in molecules/cm2 from the Aura/OMI (Ozone Monitoring Instrument) satellite platform, at pixel resolution.	NASA	NASA	global	3km	3km	No	Represented elsewhere
39	Air	Profile of Sulfur Dioxide (SO2)	SO2 (mixing ratio) from the Aura/OMI (Ozone Monitoring Instrument) satellite platform, at pixel resolution.	NASA	NASA	global	3km	3km	No	Represented elsewhere
40	Air	Vertical Profiles of Bromine Monoxide (BrO)	Vertical profiles of BrO (mixing ratio) from the Aura/MLS (Microwave Limb Sounder) satellite platform, at pixel resolution.	NASA	NASA	global	5km	5km	No	Represented elsewhere
41	Air	Vertical Profiles of Chlorine Monoxide (ClO)	Profiles of chlorine monoxide (ClO), pixel resolution (mixing ratio) from the Aura/MLS (Microwave Limb Sounder) satellite platform, at pixel resolution.	NASA	NASA	global	5km	5km	No	Represented elsewhere
42	Air	Vertical Profiles of Chlorine Dioxide (ClO)	Total column concentration of ClO2 at ground pixel resolution (26x48 km at nadir).	NASA	NASA	global	26 x 48km	26 x 48km	No	Represented elsewhere
43	Air	Vertical Profiles of Chlorine Nitrate (ClONO2)	Profiles of ClONO2 at ground pixel resolution from the Aura/HIRDLS (High Resolution Dynamics Limb Sounder) satellite platform.	NASA	NASA	global	26 x 48km	26 x 48km	No	Represented elsewhere
44	Air	Vertical Profiles of Hydrogen Chloride (HCl)	Hydrogen chloride (HCl) profiles (mixing ratios at different pressure levels) from the Aura/MLS (Microwave Limb Sounder) and UARS/HALOE (Upper Atmospheric Research Satellite)/(Halogen Occultation Experiment) satellite platform.	NASA	NASA	global	5km	5km	No	Represented elsewhere
45	Air	Hypochlorous Acid (HOCl) Profiles	Hypochlorous acid (HOCl) profiles (mixing ratios at different pressure levels), pixel resolution from the Aura/MLS (Microwave Limb Sounder) satellite platform.	NASA	NASA	global	5km	5km	No	Represented elsewhere
46	Air	Hydrogen Fluoride (HF) Profiles	Hydrogen fluoride (HF) profiles (mixing ratios at different pressure levels) from the UARS/HALOE (Upper Atmospheric Research Satellite)/(Halogen Occultation Experiment) satellite platform.	NASA	NASA	global	5km	5km	No	Represented elsewhere
47	Air	Chlorofluorocarbon Profiles	Profiles of dichlorofluoromethane CF2Cl2 and trichlorofluoromethane CFC13 (mixing ratios at different pressure levels), pixel resolution from the AURA/HIRDLS (High Resolution Dynamics Limb Sounder) satellite platform.	NASA	NASA	global	10km	10km	No	Represented elsewhere
48	Air	Hydroperoxyl Radical (HO2) Profiles	Hydroperoxyl radical, HO2 profiles (mixing ratios at different pressure levels) from the AURA/MLS (High Resolution Dynamics Limb Sounder) satellite platform.	NASA	NASA	global	5km	5km	No	Represented elsewhere

# Air Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
49	Air	Hydroxyl Radical (OH) Profiles	Profiles of hydroxyl radical (OH) (mixing ratios at different pressure levels); pixel resolution from the AURA/MLS (Microwave Limb Sounder) satellite platform.	NASA	NASA	global	5km	5km	No	Represented elsewhere
50	Air	Carbon monoxide (CO) Profiles	Profile of carbon monoxide (CO), mixing ratios at different pressure levels (ground pixel resolution) from AQUA/AIRS (Atmospheric Infrared Sounder) and AURA/MLS (Microwave Limb Sounder) satellite platforms.	NASA	NASA	global	5km	5km	No	Represented elsewhere
51	Air	Methyl Cyanide (CH <sub>3</sub> CN) Profiles	Methyl cyanide (CH <sub>3</sub> CN) profiles, mixing ratios at different pressure levels from AURA/MLS (Microwave Limb Sounder) satellite platform.	NASA	NASA	global	10km	10km	No	Represented elsewhere
52	Air	Hydrogen Cyanide (HCN) Profiles	Hydrogen cyanide (HCN) profiles (mixing ratios at different pressure levels), pixel resolution from AURA/MLS (Microwave Limb Sounder) satellite platform.	NASA	NASA	global	10km	10km	No	Represented elsewhere
53	Air	Vertical and Slant Column Abundance of Formaldehyde	Vertical and slant column abundance of formaldehyde in molecules/cm <sup>2</sup> from the Aura/OMI (Ozone Monitoring Instrument) satellite platform.	NASA	NASA	global	3km	3km	No	Non-informative

# Water Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	EQI?	Reason Not Used
BASE DATA									
172	Water	National Hydrography Dataset (NHD)	National dataset of hydrography from different scales of data (Medium - 1:100,000; High - 1:24,000; Local - 1:5,000).	USGS	USGS	conterminous US, AK, HI, and Puerto Rico, Virgin Islands, and US territories	feature	No	non-informative
173	Water	NHDPlus - National Hydrography Dataset Plus	Improved attributes to NHD database. Point-in-time extract of NHD dataset to generate new attributes and improved navigation tools. Improvements to the database will be maintained only in NHDPlus, whereas some information on flow will be passed back to NHD for integration. Future extractions of NHD are planned - but not on a regular basis.	EPA	Horizon Systems Inc.	conterminous US, AK, HI, and Puerto Rico	8 digit HUC	No	non-informative
176	Water	Aquifers - Principal Aquifers	The Principal Aquifers of the 48 Conterminous United States, Hawaii, Puerto Rico, and the U.S. Virgin Islands map layer shows those aquifers that supply ground water. For each geographic area, the aquifer shown is generally the uppermost principal aquifer. Each principal aquifer is classified as one of six types of permeable geologic material: unconsolidated deposits of sand and gravel, semi consolidated sand, sandstone, carbonate rocks, interbedded sandstone and carbonate rocks, or basalt and other types of volcanic rock. GIS database providing information on the extent and status of the Nation's wetlands. Each State data download is available as either a compressed file Geodatabase or a Shapefile. Both files are compressed by using the .zip format. The data is also available as a web mapping service ( <a href="http://www.fws.gov/wetlands/Data/WebMapServices.html">http://www.fws.gov/wetlands/Data/WebMapServices.html</a> )	USGS	USGS	conterminous US, HI, Puerto Rico, and Virgin Islands	region	No	non-informative
143	Water	National Wetlands Inventory - State download page	Not all of the United States and U.S. Territories have been digitally mapped by the U.S. Fish and Wildlife Service. Please refer to the Wetlands Mapper Wetlands Data Availability layer to view where wetlands have been mapped. Each download also includes a 'Public_Metadata' data layer that identifies where and when wetlands were mapped within the state.  NOTE: Due to the variation in use and analysis of these data by the end user, each of states wetlands data extends beyond the state boundary. Each state includes wetlands data that intersect the 1:24,000 quadrangles that contain part of that state (1:2,000,000 source data). This allows the user to clip the data to their specific analysis datasets. Beware that two adjacent states will contain some of the same data along their borders.	USFWS	USFWS	conterminous US, AK, HI, Puerto Rico, Virgin Islands, and US territories	quadrangle	No	non-informative
126	Water	National Flood Hazard Layer	National Flood Hazard Layer (NFHL) dataset is a compilation of effective Digital Flood Insurance Rate Map (DFIRM) databases (a collection of the digital data that are used in GIS systems for creating new Flood Insurance Rate Maps) and Letters of Map Change (Letters of Map Amendment and Letters of Map Revision only) that create a seamless GIS data layer for a State or Territory. It is updated on a quarterly basis. Note: Currently, not all areas of a State or Territory have effective DFIRM data. As a result, users may need to refer to the effective Flood Insurance Rate Map for effective flood hazard information. Web mapping service is available at: <a href="https://hazards.fema.gov/femaportal/wps/portal/NFHLWMS">https://hazards.fema.gov/femaportal/wps/portal/NFHLWMS</a>	FEMA/DHS	FEMA/DHS	conterminous US, AK, HI, Puerto Rico, Virgin Islands, and US territories	city, county	No	non-informative
127	Water	Coastal Barriers Resource Systems	The John H. Chafee Coastal Barrier Resources System (CBRS) is a collection of specific units of land and associated aquatic habitats that serve as barriers protecting the Atlantic, Gulf, and Great Lakes coasts. Undeveloped coastal barriers were mapped by the Department of the Interior using specific criteria, and were then enacted by Congress as units of the CBRS. The affected areas are delineated on maps enacted by Congress and entitled "John H. Chafee Coastal Barrier Resources System." The CBRS currently includes 585 System units, which comprise nearly 1.3 million acres of land and associated aquatic habitat. There are also 271 "otherwise protected areas," a category of coastal barriers already held for conservation purposes that include an additional 1.8 million acres of land and associated aquatic habitat.	USFWS	USFWS	AL, CT, DE, FL, GA, LA, ME, MD, MA, MI, MS, NJ, NY, NC, OH, PR, RI, SC, TX, VI, VA, WI	not applicable	No	non-informative
142	Water	Bureau of Reclamation (BOR) Projects and Facilities Database	The Projects and Facilities Database includes information on the major Reclamation dams, as well as the Reclamation powerplants and projects. It does not include information on some of the smaller diversion dams. Some recreational areas at Reclamation facilities are managed by the National Park Service. Additional recreational information can be found at <a href="http://www.recreation.gov">www.recreation.gov</a> .	USDOI - BOR	USDOI - BOR	western US	dam	No	non-informative
167	Water	CorpsMap - National Inventory of Dams	CorpsMap is the USACE nationwide enterprise GIS implementation. CorpsMap is the single authoritative source for USACE national geospatial data assets. CorpsMap consists of an operational geospatial database, an open interface, and a web portal. CorpsMap supports data analysis and visualization using a Web Browser, Google Earth, ESRI ArcGIS, C/JMTK, and other off-the-shelf software. National Inventory of Dams is available through this webpage with login.	USACE	USACE	conterminous US, AK, HI, Puerto Rico, Virgin Islands, and US territories	not applicable	No	non-informative



## Water Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	EQI?	Reason Not Used
MISCELLANEOUS									
121	Water	Links to National Geospatial Datasets - NRCS	Links to national datasets and data servers - common datasets used or available to the public through NRCS including the Watershed Boundaries Data (WBD)	USDA	USDA	not available	not applicable	No	non-informative
144	Water	WATSTORE - National Water Data Storage and Retrieval System	The US Geological Survey (USGS) National Water Data Storage and Retrieval System (WATSTORE) consists of several files in which water data are grouped and stored by common characteristics and data-collection frequencies. Files are maintained for the storage of (1) surface-water, quality-of-water, and ground-water data measured daily or more frequently, (2) annual peak values and peaks above a base flow for stream flow stations, (3) chemical analyses for surface- and ground-water sites, (4) geologic and inventory data for ground- water sites, and (5) water use summary data . In addition, an index file station header file of sites for which data are stored in the system is maintained in WATSTORE. This dataset has been integrated into other USGS on-line datasets at the NWIS site.	USGS	USGS	conterminous US, AK, and Hawaii	not applicable	No	represented elsewhere
156	Water	National Listing of Fish Advisories	The database includes all available information describing state-, tribal-, and federally-issued fish consumption advisories in the United States for the 50 States, the District of Columbia, and four U.S. Territories, and in Canada for the 12 provinces and territories. The database contains information provided to EPA by the states, tribes, territories and Canada.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands, and US territories	state	No	spatial coverage
168	Water	Army Geospatial Center - Water Resource Information and Links	Common Background Map (CMB) provides digital map and image data to the Warfighter. CMB utilizes a comprehensive digital data library and custom ArcGIS toolset designed to dramatically reduce the time and expense required to acquire, manage and distribute geospatial data. CMB tools for ArcGIS allow the generation of custom datasets to the user, ensuring that each users mission requirements are met. Data is disseminated on CD, DVD or hard drive.	USACE	USACE	not available	not applicable	No	spatial coverage
171	Water	Center for Human Health Risk (CHHR) - links to project data	NOAA's National Center for Coastal Ocean Science (NCCOS's) Center for Human Health Risk (CHHR) conducts research to understand and forecast relationships between coastal ocean ecosystems and human health and make information and tools available to managers and public health officials. Specific projects may be useful.	NOAA	NOAA	coastal continous US, AK, HI, Puerto Rico	not applicable	No	spatial coverage
174	Water	WATERS GeoServices	The WATERS services provide application friendly interfaces to complex analyses. These services make extensive use of the NHD and indexed program data in the RAD, and also integrate other WATERS program data in selected services.  Web and Database Services The WATERS Web and Database services provide open interfaces to complex analyses. These services make extensive use of the NHD and referenced program data in the RAD, and also integrate other WATERS program data. Designed as modular units, the services are developed in a common architecture  The WATERS Web Services use the Web Services Description Language (WSDL) to describe the functions available in each service. The services also utilize the Simple Object Access Protocol (SOAP) protocol to exchange XML messages between client applications and the services.  The WATERS Database Services require users to be on the EPA network and to have a TSMSS ID and schema password. Database Services provide users with the advantage of deploying applications within EPA that can take advantage of direct database call functionality  For services with more complex interfaces, a simplified interface has been provided for use in testing and evaluation.  The EPA Office of Water has made available several Web Mapping Services that contain nearly all of the NHD-based WATERS Program data, plus other WATERS-related layers. The services are available for use from the EPA's intranet and internet environments. The purpose of this help page is to describe the contents and purpose of each mapping service.	EPA	EPA	not available	not applicable	No	spatial coverage
175	Water	WATERS Web Mapping Services	Each service is provided in ESRI proprietary formats and Open Geospatial Consortium open standards formats to enable the display and query of spatial WATERS data. Non-developers can utilize these services using a variety of mapping and GIS applications. Using such tools the WATERS mapping services can be used as a data source, transparently integrated with other data sources such as shapefiles or geodatabase layers.	EPA	EPA	conterminous US	not applicable	No	non-informative

## Water Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	EQI?	Reason Not Used
177	Water	Agricultural Research Service Water Database	The ARS Water Database is a collection of precipitation and stream flow data from small agricultural watersheds in the United States. This national archive of variable time-series readings for precipitation and runoff contains sufficient detail to reconstruct storm hydrographs and hyetographs. There are currently about 16,600 station years of data stored in the data base. Watersheds used as study areas range from .2 hectare (0.5 acres) to 12,400 square kilometers (4,786 square miles).  Raingauge networks range from one station per watershed to over 200 stations. The period of record for individual watersheds vary from 1 to 50 years. Some watersheds have been in continuous operation since the mid 1930's. Various types of ancillary data are also maintained with the precipitation and stream flow. These include air temperature, land management practices, topography and soils information	USDA	USDA	conterminous US	not applicable	No	spatial coverage
136	Water	National Water Information System (NWIS) Water Quality Web Services	USGS and EPA are working together to provide scientists and policy-makers an easier way to integrate access to their large water-quality databases. A common suite of web services allow for the automated sharing of water monitoring data via a common format and terminology. Initial web services are now available.	USGS	USGS	conterminous US, AK, HI, and Puerto Rico	not applicable	Yes	
125	Water	Reach Address Database	Collection of EPA Water assessment programs (303d, 305b, TMDL, NPDES, CWNS, CWSRF) associated with a single point-in-time extraction of the NHDPlus database. Extraction was completed in July of 2008.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	non-informative
148	Water	Environmental Conservation System Online (ECOS)	The Environmental Conservation Online System (ECOS) is a gateway web site that provides access to data systems in the Endangered Species and Fisheries and Habitat Conservation program areas, as well as other FWS and Government data sources. ECOS provides a central point of access to assist FWS personnel in managing data and information as well as provide general public access to information from numerous FWS databases.	USFWS	USFWS	conterminous US, AK, and Hawaii	not applicable	No	non-informative
150	Water	National Contaminant Occurrence Database (NCOD)	EPA developed the NCOD to satisfy the statutory requirements set by Congress in the 1996 amendments to the Safe Drinking Water Act (SDWA) to maintain a national drinking water contaminant occurrence database using samples data for both regulated and unregulated contaminants in public water systems.  This site describes water sample analytical data that EPA is currently using and has used in the past for analysis, rulemaking, and rule evaluation. The data have been checked for data quality and analyzed for national representativeness.  NCOD data include the following: Unregulated Contaminant Occurrence Data (listed separately in this database) Six Year Review of National Drinking Water Regulations Ambient/Source Water Data	EPA	EPA	conterminous US, AK, and Hawaii	state	Yes	
162	Water	Oceanographic (Coastal) data access at National Oceanographic Data Center (NODC)	The NODC archives and distributes global oceanographic data and information. The data is used to preserve a historical record of the Earth's changing environment for ocean climate research, and for operational applications. NODC provides data products and services to scientists, engineers, resource managers, policy makers, outdoor adventurers and hobbyists, as well as other users in the United States and around the world. Of interest is data from the National Coastal Data Development Center: National Coastal Data Development Center - Pilot Project; Coastal Habitat; Coastal Ocean Observing Systems (COOS); Coastal Risk Atlas; Coastal Studies, Information, & Data for the Ecosystem (C-SIDE); Gulf of Mexico Hypoxia Watch; Harmful Algal Blooms Observing System (HABSOS)	NOAA	NOAA	world, coastal US	not applicable	No	non-informative
MODELED DATA									
117	Water	PRISM - Parameter-elevation Regressions on Independent Slope Model	Climate data (precipitation, Temperature, dewpoint, PPT%) - modeled using station values	PRISM Climate Group	PRISM Climate Group	conterminous US	not applicable	No	non-informative
122	Water	Drought Monitor Data	Downloadable shape files of weekly drought conditions and "impacts" (Agriculture, water activities)  Nolan and Hitt (2006) developed these two national models to predict contamination of ground water by nonpoint sources of nitrate. The nonlinear approach to national-scale Ground-Water Vulnerability Assessment (GWAVA) uses components representing nitrogen (N) sources, transport, and attenuation. Users should consult the individual metadata file for each data set for details.	NOAA	NOAA	conterminous US, AK, HI, and Puerto Rico	not applicable	Yes	
134	Water	Shallow ground water and drinking-water wells to nitrate		USGS	USGS	conterminous US	1000m	No	temporal coverage

## Water Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	EQ?	Reason Not Used
138	Water	Estimate Use of Water in the US	The U.S. Geological Survey's National Water-Use Information Program is responsible for compiling and disseminating the nation's water-use data. The USGS works in cooperation with local, State, and Federal environmental agencies to collect water-use information. USGS compiles these data to produce water-use information aggregated at the county, state, and national levels. Every five years, data at the county level are compiled into a national water-use data system and state-level data are published in a national circular. The primary objective of this effort was to compile measured annual nitrogen (N) and phosphorus (P) load and concentration data representing field-scale transport from agricultural land uses.	USGS	USGS	conterminous US, AK, HI, and Puerto Rico	county	Yes	
178	Water	Nutrient Loss database for Agricultural Fields in the US	The resulting publicly available data base provides: 1) measured nutrient load and concentration data and corresponding watershed characteristics from numerous field-scale studies, 2) readily accessible, easily queried information to support water quality management, modeling, and future research design, and 3) a platform allowing user input of additional project-specific data.	USDA	USDA	conterminous US	watershed	No	spatial coverage

## MONITORING DATA

101	Water	National Coastal Beach Monitoring web access page	Monitoring of (ocean/great lakes) coastal beaches - data collected at the national level and maintained and presented through this web page.	EPA	state agencies	coastal continerminous US, AK, HI, Puerto Rico, Virgin Islands, and US territories	not applicable	No	represented elsewhere
102	Water	Beach Monitoring and Notification data access page	Data submitted to EPA for beach monitoring program by state - stored in EPA PRAWN database (PRAWN is the PRogram tracking, beach Advisories, Water quality standards, and Nutrients database. PRAWN stores beach advisory and closing data.)	EPA	multiple state agencies and tribes	coastal continerminous US, AK, HI, Puerto Rico, Virgin Islands, US territories, and Iowa (IA)	feature	No	temporal coverage
103	Water	Iowa Watershed Monitoring Assessment	Web site listing numerous water monitoring programs within the state stored in EPA STORET database format. Information no beach monitoring is available for the state of Iowa and is located on this page.	IA	IA	IA	site	No	spatial coverage
104	Water	USGS Real-Time Surface Water Data	Daily Stream flow Conditions from National Water Information System (NWIS).	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	temporal coverage
105	Water	USGS Surface Water Data - Daily Data	Stream flow Conditions from National Water Information System (NWIS).	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage
106	Water	USGS Surface Water Data - Statistics	Daily Stream flow Conditions from National Water Information System (NWIS) - statistics calculated for daily/monthly/annual	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage
107	Water	USGS Surface Water Data - Peak-flow	Peak-flow (annual maximum) Conditions from National Water Information System (NWIS)	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage
108	Water	USGS Surface Water Data - Field Measurements	Periodic manual measurements used to supplement or verify the time-series measurements from National Water Information System (NWIS)	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage
109	Water	USGS Real-Time Ground-Water Data	Current hydrologic conditions from Wells/Springs/Test Holes/Tunnels/Drains/Excavations in the US - stored in National Water Information System (NWIS)	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage
110	Water	USGS Ground Water Data - Daily Data	Summarized daily values from Wells/Springs/Test Holes/Tunnels/Drains/Excavations in the US - stored in National Water Information System (NWIS)	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage
111	Water	USGS Ground Water Data - Statistics	Summarized daily/monthly/annual statistic values from Wells/Springs/Test Holes/Tunnels/Drains/Excavations in the US - stored in National Water Information System (NWIS)	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage
112	Water	USGS Ground Water Data - Field Measurements	Periodic manual measurements (depth of water in wells) used to supplement or verify the time-series measurements in National Water Information System (NWIS)	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage
113	Water	USGS Real-Time Water Quality Data	Daily physical and chemical properties of selected surface and groundwater sites - and supporting climatic data at a subset of sites in the National Water Information System (NWIS). Approximately 1,480 sites with data are available through this service.	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage
114	Water	USGS Water Quality Data - Daily Data	Daily values summarized from time-series data of physical and chemical properties of selected surface and groundwater sites - and supporting climatic data at a subset of sites in the National Water Information System (NWIS). Approximately 7,024 sites with data are available through this service.	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage
115	Water	USGS Water Quality Data - Statistics	Daily values summarized from National Water Information System (NWIS) - statistics calculated for daily/monthly/annual (water year or calendar year) time periods. Approximately 2,729 sites with data are available through this service.	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage
116	Water	USGS Water Quality Data - Field Measurements	Data from field and/or laboratory analyses of water samples, biological tissue, stream sediments, or other environmental samples. Data include approved, quality-assured data that may be published, and more recent provisional data, whose accuracy has not been verified, from National Water Information System (NWIS). Approximately 371,691 sites with data are available through this service.	USGS	USGS	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	spatial coverage



Water Domain									
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	EQI?	Reason Not Used
118	Water	SNOTEL - Snowpack Telemetry	The Natural Resources Conservation Service (NRCS) installs, operates, and maintains an extensive, automated system to collect snowpack and related climatic data in the Western United States called SNOTEL (for SNOWpack TELemetry). The system evolved from NRCS's Congressional mandate in the mid-1930's "to measure snowpack in the mountains of the West and forecast the water supply." The programs began with manual measurements of snow courses; since 1980, SNOTEL has reliably and efficiently collected the data needed to produce water supply forecasts and to support the resource management activities of NRCS and others.	USDA	USDA	western US	not applicable	No	spatial coverage
119	Water	Snow Course	Permanent sites where manual measurements of snow depth and snow water equivalents are taken. Reports on snowpack at the state and basin level are created from these data. Part of the National Water and Climate Center of the Natural Resources Conservation Service (NRCS).	USDA	USDA	western US	not applicable	No	spatial coverage
123	Water	Active Groundwater Level Network	Ground water level and well information for 20,000 wells- current condition only. The Active Groundwater Level Network contains water levels and well information from more than 20,000 wells that have been measured by the USGS or USGS cooperators at least once within the past 365 days. This network includes all of these wells, regardless of measurement frequency, aquifer monitored, or the monitoring objective.	USGS	USGS	conterminous US, AK, HI, and Puerto Rico	not applicable	No	spatial coverage
145	Water	National Atmospheric Deposition Program - National Trends Network (NTN)	The U.S. Geological Survey has a database/archive of about 850,000 wells across the Nation. Information about these wells is available to the world via NWISWeb. Through various groundwater programs, the USGS actively measures water levels in about 20,000 of these wells each year. These wells are measured for a variety of disparate purposes, such as statewide monitoring programs, or more local effects like monitoring well drawdown, hydrologic research, aquifer tests, or even earthquake effects on water levels.	NADP	NADP	conterminous US	not applicable	Yes	
146	Water	National Atmospheric Deposition Program - Mercury Deposition Network (MDN)	The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) is a nationwide network of precipitation monitoring sites. The network is a cooperative effort between many different groups, including the State Agricultural Experiment Stations, U.S. Geological Survey, U.S. Department of Agriculture, and numerous other governmental and private entities. For a full list of contributors, see the collaborating agencies page. The NADP/NTN has grown from 22 stations at the end of 1978, our first year, to over 250 sites spanning the continental United States, Alaska, and Puerto Rico, and the Virgin Islands.	NADP	NADP	conterminous US, AK	not applicable	Yes	
170	Water	Phytoplankton Monitoring Network	The objective of the MDN is to develop a national database of weekly concentrations of total mercury in precipitation and the seasonal and annual flux of total mercury in wet deposition. The data will be used to develop information on spatial and seasonal trends in mercury deposited to surface waters, forested watersheds, and other sensitive receptors.	NOAA	NOAA	coastal continous US, AK, HI, Puerto Rico	not applicable	No	temporal coverage
REPORTED DATA									
120	Water	Water Supply Forecasting Service - multiple databases	Phytoplankton Monitoring Network (PMN) is an outreach program with the ultimate goal of linking laboratory scientists to the general public. Traditionally scientists rarely interacted with the public they serve. The link PMN provides, fosters a more informed public while providing qualitative data to scientists.	USDA	USDA	western US	basins	No	spatial coverage
124	Water	Safe Drinking Water Information System	1) Water Supply Forecasting, 2) Reservoir reporting, 3) Surface Water Supply Index - Modelled data.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	Yes	
147	Water	Fish Passage Decision Support System	Drinking water information - public health risks. The Safe Drinking Water Information System (SDWIS) federal and state databases contain information submitted by states, EPA regions, and public water systems in conformance with reporting requirements established by the Safe Drinking Water Act (SDWA) and related regulations and guidance.	USFWS	USFWS	conterminous US	barrier site	No	non-informative
159	Water	COAST (Coastal Ocean Assessments, Status, and Trends) Mussel Watch Contaminant Monitoring Program	States supervise the drinking water systems within their jurisdictions to ensure that each public water system meets state and EPA standards for safe drinking water. SDWA requires states to report drinking water information periodically to EPA; this information is maintained in the federal database, SDWIS/FED	NOAA	NOAA	coastal continous US, AK, HI, Puerto Rico	site	No	non-informative
160	Water	COAST (Coastal Ocean Assessments, Status, and Trends) Bioeffects Assessment Project	The dataset was created to identify barrier locations across the United States and to support modeling/report activities on the Fish Passage Support System website ( <a href="http://ecos.fws.gov/fpdss">http://ecos.fws.gov/fpdss</a> ).	NOAA	NOAA	coastal continous US, AK, HI, Puerto Rico	site	No	non-informative



# Water Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	EQI?	Reason Not Used
161	Water	Fisheries Information System (FIS) - National Marine Fisheries Service	The Fisheries Information System (FIS) provides a context for the design, development, and implementation of data collection and data management for fishery-dependent statistics nationwide to improve the timeliness and accuracy of data. FIS is a portal that identifies the existing federal and state fisheries information systems or databases (data collections) and provides integrated business solutions for effective information sharing.	NOAA	NOAA	not available	not applicable	No	spatial coverage
165	Water	National Outbreak Reporting System	The National Outbreak Reporting System (NORS) is a web-based platform designed to support reporting of waterborne, foodborne, enteric person-to-person, and animal contact-associated disease outbreaks to CDC by state and territorial public health agencies. NORS launched in 2009 following a four year commitment by CDC to the planning, development, and launch phases of the project. CDC developed NORS for waterborne disease outbreak reporting in collaboration with the Council for State and Territorial Epidemiologists (CSTE) and the Environmental Protection Agency (EPA) to improve the quality, quantity, and availability of data submitted to the Waterborne Disease and Outbreak Reporting System (WBDOS).	CDC	CDC	not available	not applicable	No	non-informative
166	Water	Centers for Disease Control and Prevention (CDC) - Water-related Health Data	This list provides links to various health related data (surveillance summaries, outbreak reports, and surveillance systems) for potentially waterborne or water-related diseases and injuries. Data on all nationally notifiable diseases in the U.S. are summarized annually in the MMWR (Measles Mumps, Rubella, Varicella Vaccine Safety) and can be accessed at <a href="http://www.cdc.gov/hcphi/diss/mndss/annsum/index.htm">http://www.cdc.gov/hcphi/diss/mndss/annsum/index.htm</a> . Surveillance system and data links have been chosen because the information is electronically accessible. Outbreaks cited are those documented in CDC publications (MMWR, Emerging Infectious Diseases (EID)) which are not copyrighted.	CDC	CDC	not available	not applicable	No	non-informative
149	Water	National Pollutant Discharge Elimination System (NPDES)	ICIS - Integrated Compliance. The Integrated Compliance Information System (ICIS) provides a database that, when complete, will contain integrated enforcement and compliance information across most of EPA's programs. The vision for ICIS is to replace EPA's independent databases that contain Enforcement data with a single repository for that information. Currently, ICIS contains all Federal Administrative and Judicial enforcement actions. A future release of ICIS will replace the Permit Compliance System (PCS) which supports the National Pollutant Discharge Elimination System (NPDES) and will integrate that information with Federal actions already in the system. This file contains the subset of NPDES Majors that have thus far been integrated into ICIS. The site contains technical and regulatory information about the NPDES permit program. The NPDES Permits Program consists of a number of programs and initiatives. Links to each of these programs and initiatives are located on the left navigational bar.  For information on specific facilities with NPDES permits, you can visit EPA's Envirofacts Warehouse. Simple searches can be done by clicking on "Water" and entering your zip code. You can also view a map with NPDES facilities by clicking on "Maps" and choosing "EnviroMapper." Finally, advanced search capabilities can be found under "Queries" and selecting "PCS."  For information on the compliance and enforcement status of facilities with NPDES permits, you can visit EPA's Enforcement and Compliance History Online (ECHO)	EPA	EPA	conterminous US, AK, HI, Puerto Rico, Virgin Islands, and US territories	site	Yes	
154	Water	303(d) Listed Impaired Waters - WATERS Database	River segments, lakes, and estuaries designated under Section 303(d) of the Clean Water Act. Each State will establish Total Maximum Daily Loads (TMDLs) for these waters. 303(d) Waterbodies are coded onto route.rch (Transport and Coastline Reach) feature of NHD to create Linear and Point Events. Point events are attached to a reach in NHD to represent a TMDL for many reasons: to represent an estuary, to represent a shellfish area (if state preferred to represent the TMDL in this manner) - refer to NOAA's shellfish areas for a more accurate representation ( <a href="http://state-of-coast.noaa.gov/bulletins/html/sgw_04/sgw.html">http://state-of-coast.noaa.gov/bulletins/html/sgw_04/sgw.html</a> ). Point events represent point source dischargers, or, if there is no reach in NHD, they are used to represent the TMDL. 303(d) Waterbodies are coded onto NHD Waterbody reaches (region.rch) to create Waterbody Shapefiles. In addition to NHD reach indexed data there may also be custom shapefiles (point, line, or polygon) that are not associated with NHD and are in an EPA standard format that is compatible with EPA's Reach Address Database. These custom shapefiles are used to represent locations of 303(d) waterbodies that are not represented well in NHD.	EPA	EPA	conterminous US, AK, and Hawaii	feature	Yes	

# Water Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	EQI?	Reason Not Used
155	Water	303(c) Water Quality Standards - WATERS Database	State (also includes DC, tribes, and territories; i.e., "jurisdictions") Water Quality Standards' Designated Uses for river segments, lakes, and estuaries. The Water Quality Standards' Designated Uses are able to be linked to tables of water quality criteria which are located in EPA's Water Quality Standards Database. Water Quality Standards coded onto route.rch (Transport and Coastline Reach) feature of the National Hydrography Dataset (NHD) to create NHD Linear and Point Events. Point events are attached to a reach in NHD for many reasons: to represent an estuary; represent a drinking water intake point; or to represent a designated use when there is no reach in NHD to represent that reach. Water Quality Standards coded onto the National Hydrography Dataset (NHD) Waterbody Reaches (region.rch) to create Waterbody Shapefiles. In addition to NHD reach indexed data there may also be custom shapefiles (point, line, or polygon) that are not associated with NHD and are in an EPA standard format that is compatible with EPA's Reach Address Database. These custom shapefiles are used to represent Water Quality Standards that are not represented well in NHD.	EPA	EPA	conterminous US, AK, and Hawaii	feature	Yes	
SURVEY / STUDY DATA									
140	Water	EMAP National Coastal Assessment (NCA) - Estuaries data	To answer broad-scale questions on environmental conditions, EMAP and its partners have collected estuarine and coastal data from thousands of stations along the coasts of the continental United States. EMAP's National Coastal Assessment comprises all the estuarine and coastal sampling done by EMAP beginning in 1990. This coverage includes the sampling done in the biogeographic provinces as well as data from the Regional EMAP (REMAP) studies done by EPA Regional Offices. These data can be retrieved and stations mapped from applications under NCA Data.	EPA	EPA	coastal continenous US	not applicable	No	temporal coverage
141	Water	Mid-Atlantic Integrated Assessment (MAIA)	Data on Estuaries, Surface Waters, Landscape Ecology, Forests, and Agro-ecosystems. See documentation for all variables surveyed.	EPA	EPA	Mid-Atlantic - EPA Region 3	not applicable	No	spatial coverage
139	Water	Wadeable Streams Assessment	The Wadeable Streams Assessment: A Collaborative Survey of the Nation's Streams (WSA) is a first-ever statistically-valid study of the biological condition of small streams throughout the U.S. It establishes a national baseline we can use to compare to results from future studies. This information will help us evaluate the successes of our national efforts to protect and restore water quality.	EPA	EPA	conterminous US	state	No	spatial coverage
163	Water	National Lake Fish Tissue Study	EPA conducted a national freshwater fish contamination survey to estimate the national distribution of selected persistent, bioaccumulative and toxic chemical residues in fish tissue from lakes and reservoirs in the lower 48 states. This four-year study provides the first national estimates of mean concentrations for 268 chemicals in lake fish, defines a national fish contamination baseline to track progress of pollution control activities, and identifies areas where contaminant levels are high enough to warrant further investigation.	EPA	EPA	conterminous US	feature	No	non-informative
164	Water	National Aquatic Resource Surveys	The U.S. Environmental Protection Agency, states, and tribes are conducting a series of national aquatic resource surveys. Often referred to as probability-based surveys, these studies report on core indicators of water condition using standardized field and lab methods. The surveys include a national quality assurance program and are designed to yield unbiased, statistically-representative estimates of the condition of the whole water resource (such as rivers and streams, lakes, ponds, and reservoirs, wetlands, etc).	EPA	EPA	conterminous US	state	No	temporal coverage
179	Water	EMAP West - Ecological Assessment of Western Streams and Rivers	This statistical summary reports data from the Environmental Monitoring and Assessment Program (EMAP) Western Pilot (EMAP-W). EMAP-W was a sample survey (or probability survey, often simply called 'random') of streams and rivers in 12 states of the western U.S. (Arizona, California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, Washington and Wyoming), comprising the conterminous portions of EPA Regions 8, 9 and 10. The eventual objective of EMAP-W is to assess the ecological condition of, and relative importance of, stressors in streams and rivers of the West at multiple scales.	EPA	EPA	western US	state	No	spatial coverage
180	Water	Environmental Monitoring and Assessment Program (EMAP) / Aquatic Resource Monitoring (ARM) Program	The Environmental Monitoring and Assessment Program (EMAP) is a research program to develop the tools necessary to monitor and assess the status and trends of national ecological resources (see EMAP Research Strategy). EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of ecological condition and forecasts of the future risks to the sustainability of our natural resources. EMAP's research supports the National Environmental Monitoring Initiative of the Committee on Environment and Natural Resources (CENR).	EPA	EPA	western US	state	No	spatial coverage

# Water Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	EQ?	Reason Not Used
129	Water	National Water-Quality Assessment (NAWQA) Program - Quality of Domestic Wells Study	This study from the National Water-Quality Assessment (NAWQA) Program of the U.S. Geological Survey (USGS) assesses water-quality conditions for about 2,100 domestic wells across the United States. As many as 219 properties and contaminants, including pH, major ions, nutrients, trace elements, radon, pesticides, and volatile organic compounds, were measured. Fecal indicator bacteria and additional radionuclides were analyzed for a smaller number of wells. The large number of contaminants assessed and the broad geographic coverage of the present study provides a foundation for an improved understanding of the quality of water from the major aquifers tapped by domestic supply wells in the United States.	USGS	USGS	conterminous US, AK	well locations given at county level	No	spatial coverage
130	Water	National Water-Quality Assessment (NAWQA) Program - Source Water-Quality Assessment Program (SWQA)	The primary objective of SWQAs is to determine the occurrence of about 280 primarily unregulated anthropogenic organic compounds in source water used by community water systems. Source water is the raw (ambient) water collected at a supply well or surface-water intake prior to water treatment used to produce finished water. A secondary objective is to understand occurrence patterns in source water and determine if these patterns also occur in finished water prior to distribution. The NAWQA Program is planning as many as 30 surface-water and 30 ground-water assessments through 2013. The findings are not intended to comprehensively portray the quality of our Nation's source waters owing to the relatively small number of water supplies studied. They are, however, intended to improve understanding of ambient resource conditions in a drinking-water-supply context.	USGS	USGS	conterminous US	not applicable	No	spatial coverage
131	Water	National Water-Quality Assessment (NAWQA) Program - Health Based Screening Levels	This is a tool to extract information on contaminant levels detected in water resources. To supplement existing Federal drinking-water standards and guidelines, USGS began a collaborative project with the U.S. Environmental Protection Agency (USEPA), New Jersey Department of Environmental Protection (NJDEP), and Oregon Health & Science University (OHSU) to calculate Health-Based Screening Levels (HBSLs). HBSLs were calculated for contaminants that do not have USEPA Maximum Contaminant Levels.	USGS	USGS	not available	not applicable	No	non-informative
132	Water	National Water-Quality Assessment (NAWQA) Program - Pesticide National Synthesis Project	A decadal assessment by the National Water-Quality Assessment (NAWQA) Program of the United States Geological Survey (USGS) provides the most comprehensive national-scale analysis to date of pesticide occurrence and concentrations in streams and ground water, based on results from studies completed during 1992–2001. Among the major findings are that pesticides are frequently present in streams and ground water, are seldom at concentrations likely to affect humans, but occur in many streams at concentrations that may have effects on aquatic life or fish-eating wildlife.	USGS	USGS	conterminous US	not applicable	No	spatial coverage
133	Water	National Water-Quality Assessment (NAWQA) Program - Nutrients National Synthesis Project	Nutrient studies portion of NAWQA decade long research. Some studies include: Nutrient trends, Nitrate change in ground water, Nutrients in streams, Vulnerability to nitrates, Drinking-water nitrate and health. This webpage is a link to these research studies. Data can be retrieved through NWIS or by contacting the authors.	USGS	USGS	conterminous US, AK, and Hawaii	not applicable	No	temporal coverage
135	Water	NAWQA - Volatile Organic Compounds in the Nation's Ground Water and Drinking-Water Supply Wells	Volatile organic compounds VOCs are produced in large volumes and are of concern in water resources because of their potential toxicity to humans, in part via exposure from drinking water. The general purpose of the VOC National Synthesis of the NAWQA Program is to expand knowledge about the occurrence of this group of organic compounds in the environment with emphasis on ground water, surface water, and water withdrawn for supply of drinking water. The synthesis is unique in that its focus is on ambient water resources rather than extensively contaminated release sites. Furthermore, the synthesis fills important voids of information about VOCs for the Nation's major aquifers and urban streams.	USGS	USGS	conterminous US, AK, and Hawaii	site	No	spatial coverage
137	Water	National Water-Quality Assessment (NAWQA) Program - Trace Element National Synthesis Project	Arsenic concentration data for 20,043 ground-water samples. Data compiled using the same methods and criteria as for USGS Publication: WRI 99-4279, but extending the sampling dates until March 30, 2000	USGS	USGS	conterminous US, AK, HI, and Puerto Rico	not applicable	No	spatial coverage
151	Water	Unregulated Contaminant Monitoring Data - States Round 1 and 2	EPA uses the Unregulated Contaminant Monitoring Regulation (UCMR) to collect data for contaminants suspected to be present in drinking water, but do not have health-based standards set under the Safe Drinking Water Act (SDWA). The data assist the Administrator in determining whether or not to regulate those contaminants	EPA	EPA	conterminous US	state	No	spatial coverage
152	Water	Unregulated Contaminant Monitoring Rule 1 (UCMR 1)	The regulation for the first cycle of the Unregulated Contaminant Monitoring Rule (UCMR 1), covering the period 2001 - 2005, was published in the Federal Register September 17, 1999 for a list of 26 contaminants. UCMR1 was a redesign of the original UCM Program, and incorporated a tiered monitoring approach along with EPA implementation. UCMR1 had Assessment Monitoring (List 1) and Screening Survey (List 2) components.	EPA	EPA	conterminous US	state	No	spatial coverage
153	Water	Unregulated Contaminant Monitoring Rule2 (UCMR 2)	The Unregulated Contaminant Monitoring Regulation supporting the second cycle (UCMR2) of monitoring, conducted under EPA oversight, was published in the Federal Register on January 4, 2007. The UCMR2 requires monitoring for 25 contaminants using five analytical methods.	EPA	EPA	conterminous US, AK, and Hawaii	state	No	temporal coverage



# Water Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	EQI?	Reason Not Used
169	Water	National Estuarine Eutrophication Assessment (NEEA)	The National Estuarine Eutrophication Assessment (NEEA) is a joint initiative between the NOAA National Centers for Coastal Ocean Science (NCCOS) and the Integration and Application Network (IAN). The NEEA Update is part of the NEEA Program (Program Guidance Document) and uses the ASSETS (Assessment of Estuarine Trophic Status) methodology which is a collaborative effort between NOAA and the Portuguese Institute of Marine Research (IMAR). The ASSETS methodology is designed improve upon the assessment of the 1999 U.S. National Estuarine Eutrophication Assessment (NEEA) to make it more accurate and more broadly applicable to different types of systems.	NOAA	U of Maryland Integration and Application Network	141 coastal US estuaries	site	No	non-informative
128	Water	National Stream Quality Accounting Network (NASQAN)	The objectives and scope of the NASQAN program have changed several times since its beginnings in 1973 to reflect changes in funding, technology, and societal priorities and needs. The latest design for NASQAN was implemented in October 2007. Under this design, the major objective of the NASQAN program is to report on the concentrations and loads of selected constituents delivered by major rivers to the coastal waters of the United States and selected inland sub-basins in priority river basins to determine the sources and relative yields of constituents within these basins. These priority basins have significant management interest in reducing delivery of constituents that contribute to adverse conditions in receiving waters. Other objectives include monitoring for climate change and describing long-term trends in the loads and concentrations of select constituents at key locations.	USGS	USGS	conterminous US, AK, and Hawaii	not applicable	No	non-informative
158	Water	Clean Watersheds Needs Survey (CWNS)	The CWNS is conducted in response to Sections 205(a) and 516 of the Clean Water Act. The CWNS is a comprehensive assessment of the capital needs to meet the water quality goals set in the Clean Water Act. Every four years, the states and EPA collect information about:  Publicly owned wastewater collection and treatment facilities Stormwater and combined sewer overflows (CSOs) control facilities Nonpoint source (NPS) pollution control projects Decentralized wastewater management Estuary management projects	EPA	EPA	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	not applicable	No	non-informative
157	Water	Water Quality Criteria for Nitrogen and Phosphorus Pollution	Nutrient pollution, especially from nitrogen and phosphorus, has consistently ranked as one of the top causes of degradation in some U.S. waters for more than a decade. Excess nitrogen and phosphorus lead to significant water quality problems including harmful algal blooms, hypoxia and declines in wildlife and wildlife habitat. Excesses have also been linked to higher amounts of chemicals that make people sick.	EPA	EPA	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	state	No	temporal coverage



Land Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
AGRICULTURE										
159	Land	1997 County Pesticide Use Estimates for 220 Compounds	This dataset includes information for 220 pesticides on the average amount (pounds) applied to 87 agricultural crops and the acres of crops treated for counties within the conterminous United States. These data were derived by combining published state pesticide use coefficients published by the National Center for Food and Agricultural Policy (NCFAP) and county harvested crop acres available from the 1997 Census of Agriculture.	USGS	USGS	conterminous US	county	not applicable	NO	Temporal coverage
160	Land	1992 County Pesticide Use Estimates for 200 Compounds	This dataset includes information for 200 pesticides on the average amount (pounds) applied to 87 agricultural crops and the acres of crops treated for counties within the conterminous United States. These data were derived by combining published state pesticide use coefficients published by the National Center for Food and Agricultural Policy (NCFAP) and county harvested crop acres available from the 1992 Census of Agriculture.	USGS	USGS	conterminous US	county	not applicable	NO	Temporal coverage
161	Land	Grids of Agricultural Pesticide Use in the Conterminous US 1997	This spatial dataset consists of 219 1-kilometer (km) resolution grids depicting estimated agricultural use of 219 pesticides in 1997 for the conterminous United States.	USGS	USGS	conterminous US	1km cell	1km	NO	Temporal coverage
162	Land	Grids of Agricultural Pesticide Use in the Conterminous US 1992	This spatial dataset consists of 199 1-kilometer (km) resolution grids depicting estimated agricultural use of 199 pesticides in 1992 for the conterminous United States.	USGS	USGS	conterminous US	1km cell	1km	NO	Temporal coverage
185	Land	Potential Priority Watersheds for Protection of Water Quality from Nonpoint Sources Related to Agriculture	National maps were developed to assist decision-makers in identifying priority watersheds for water quality protection from nonpoint sources related to agriculture. The purpose of these maps is to systematically identify where the greatest potential exists for water pollution based on factors known to be important influences on soil and chemical loss from farm fields, such as climate, soil characteristics, and pesticide and nitrogen loadings from agricultural sources. The basis for the analysis is 2,105 8-digit hydrologic units, or watersheds, in the 48 States (910,000 acres average size).	NRCS	NRCS	conterminous US	8-digit hydrologic unit	not applicable	NO	Non-informative
186	Land	Potential Priority Watersheds for Protection of Water Quality from Contamination by Manure Nutrients	National maps were developed to assist decision-makers in identifying priority watersheds for water quality protection from contamination by manure nutrients. Manure applied to the land is susceptible to leaching and runoff, and can be a significant source of contamination of groundwater and surface water.	NRCS	NRCS	conterminous US	8-digit hydrologic unit	not applicable	NO	Non-informative
187	Land	Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients: Spatial Trends for the US	Data from the Census of Agriculture were used to estimate livestock populations, quantities of manure produced, and land available for manure application for 1982, 1987, 1992, and 1997. Livestock include beef cattle, dairy cattle, swine, and poultry. A descriptive analysis is presented of the temporal and spatial changes in the number, size, and kind of livestock operations, and the changes in animal units, quantity of manure nutrients produced, land available for manure application, and excess manure nutrients at both the farm level and the county level.	NRCS	NRCS	conterminous US, AK, HI, and US territories	county	not applicable	NO	Represented elsewhere
191	Land	2007 Census of Agriculture Full Report	A comprehensive summary of agricultural activity is provided for the United States and each of the 50 states. This report includes number of farms by size and type, inventory and values for crops and livestock, operator characteristics and much more.	USDA	USDA	conterminous US, AK, and HI	county	not applicable	NO	Temporal coverage
192	Land	2002 Census of Agriculture Full Report	A comprehensive summary of agricultural activity is provided for the United States and each of the 50 states. This report includes number of farms by size and type, inventory and values for crops and livestock, operator characteristics and much more.	USDA	USDA	conterminous US, AK, and HI	county	not applicable	YES	N/A
193	Land	Agriculture Census of the United States - 2002	The census provides comprehensive, uniform data about America's farms and farmers. American agriculture is counted, measured, priced, analyzed, and reported to provide the facts needed by farmers and ranchers, agribusiness, policymakers, farm organizations, and state and local agencies.	USDA	USGS	conterminous US, AK, and HI	county	not applicable	NO	Represented elsewhere

Land Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
194	Land	National Pesticide Use Database - 2002	The National Pesticide Use Database (2002), compiled by the Crop Protection Research Institute of the CropLife Foundation, contains quantitative data on the use of fungicides, herbicides, insecticides, and other pesticides in US crop production.	CropLife Foundation	CropLife Foundation	conterminous US, AK, and HI	state	not applicable	YES	N/A
195	Land	Dun and Bradstreet Agriculture Data	This data layer is made up of agricultural data licensed from Dun & Bradstreet for the entire United States. These data include information about both crops and livestock.	EPA	EPA	conterminous US, AK, and HI	point	not applicable	NO	Represented elsewhere
153	Land	California Pesticide Use Reporting (PUR) Database	Pesticide use data for California.	California Department of Pesticide Regulation	California Department of Pesticide Regulation	CA	individual land parcels	not applicable	NO	Spatial coverage
118	Land	Cropland Data Layer (CDL) - Arkansas	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	AR	60m cell	60m	NO	Spatial coverage
119	Land	Cropland Data Layer (CDL) - California	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	CA	60m cell	60m	NO	Spatial coverage
120	Land	Cropland Data Layer (CDL) - Colorado	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	CO	60m cell	60m	NO	Spatial coverage
121	Land	Cropland Data Layer (CDL) - Connecticut	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	CT	60m cell	60m	NO	Spatial coverage
122	Land	Cropland Data Layer (CDL) - Delaware	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	DE	60m cell	60m	NO	Spatial coverage
123	Land	Cropland Data Layer (CDL) - Florida	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	FL	60m cell	60m	NO	Spatial coverage
124	Land	Cropland Data Layer (CDL) - Idaho	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	ID	60m cell	60m	NO	Spatial coverage
125	Land	Cropland Data Layer (CDL) - Illinois	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	IL	60m cell	60m	NO	Spatial coverage
126	Land	Cropland Data Layer (CDL) - Indiana	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	IN	60m cell	60m	NO	Spatial coverage
127	Land	Cropland Data Layer (CDL) - Iowa	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	IA	60m cell	60m	NO	Spatial coverage
128	Land	Cropland Data Layer (CDL) - Kansas	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	KS	60m cell	60m	NO	Spatial coverage
129	Land	Cropland Data Layer (CDL) - Kentucky	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	KY	60m cell	60m	NO	Spatial coverage
130	Land	Cropland Data Layer (CDL) - Louisiana	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	LA	60m cell	60m	NO	Spatial coverage
131	Land	Cropland Data Layer (CDL) - Maryland	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	MD	60m cell	60m	NO	Spatial coverage
132	Land	Cropland Data Layer (CDL) - Michigan	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	MI	60m cell	60m	NO	Spatial coverage

Land Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
133	Land	Cropland Data Layer (CDL) - Minnesota	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	MN	60m cell	60m	NO	Spatial coverage
134	Land	Cropland Data Layer (CDL) - Mississippi	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	MS	60m cell	60m	NO	Spatial coverage
135	Land	Cropland Data Layer (CDL) - Missouri	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	MO	60m cell	60m	NO	Spatial coverage
136	Land	Cropland Data Layer (CDL) - Montana	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	MT	60m cell	60m	NO	Spatial coverage
137	Land	Cropland Data Layer (CDL) - Nebraska	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	NE	60m cell	60m	NO	Spatial coverage
138	Land	Cropland Data Layer (CDL) - New Jersey	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	NJ	60m cell	60m	NO	Spatial coverage
139	Land	Cropland Data Layer (CDL) - New York	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	NY	60m cell	60m	NO	Spatial coverage
140	Land	Cropland Data Layer (CDL) - North Carolina	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	NC	60m cell	60m	NO	Spatial coverage
141	Land	Cropland Data Layer (CDL) - North Dakota	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	ND	60m cell	60m	NO	Spatial coverage
142	Land	Cropland Data Layer (CDL) - Ohio	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	OH	60m cell	60m	NO	Spatial coverage
143	Land	Cropland Data Layer (CDL) - Oklahoma	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	OK	60m cell	60m	NO	Spatial coverage
144	Land	Cropland Data Layer (CDL) - Oregon	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	OR	60m cell	60m	NO	Spatial coverage
145	Land	Cropland Data Layer (CDL) - Pennsylvania	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	PA	60m cell	60m	NO	Spatial coverage
146	Land	Cropland Data Layer (CDL) - Rhode Island	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	RI	60m cell	60m	NO	Spatial coverage
147	Land	Cropland Data Layer (CDL) - South Dakota	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	SD	60m cell	60m	NO	Spatial coverage
148	Land	Cropland Data Layer (CDL) - Texas	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	TX	60m cell	60m	NO	Spatial coverage
149	Land	Cropland Data Layer (CDL) - Virginia	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	VA	60m cell	60m	NO	Spatial coverage
150	Land	Cropland Data Layer (CDL) - West Virginia	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	WV	60m cell	60m	NO	Spatial coverage



Land Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
151	Land	Cropland Data Layer (CDL) - Washington	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	WA	60m cell	60m	NO	Spatial coverage
152	Land	Cropland Data Layer (CDL) - Wisconsin	The USDA, NASS (National Agricultural Statistics Service) Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer with a ground resolution of 56 meters.	USDA	USDA	WI	60m cell	60m	NO	Spatial coverage
FACILITIES										
163	Land	EPA's Web Feature Service for National Priority List (NPL) Sites	This web feature service provides locations of and information on sites that have been placed on the National Priority List (NPL). The NPL is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories.	EPA	EPA	conterminous US, AK, HI, and US territories	point	not applicable	YES	N/A
164	Land	Superfund National Priorities List (NPL) Sites	NPL site locations available through the EPA Geospatial Data Access Project.	EPA	EPA	conterminous US, AK, HI, and US territories	point	not applicable	YES	N/A
169	Land	Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal Facilities (TSD) and (RCRA) Corrective Action Facilities	RCRA TSD and Corrective Action Facilities site locations available through the EPA Geospatial Data Access Project.	EPA	EPA	conterminous US, AK, HI, and US territories	point	not applicable	YES	N/A
171	Land	Resource Conservation and Recovery Act (RCRA) Large Quantity Generators (LQG)	RCRA LQG site locations available through the EPA Geospatial Data Access Project.	EPA	EPA	conterminous US, AK, HI, and US territories	point	not applicable	YES	N/A
172	Land	Toxics Release Inventory (TRI) Sites	TRI site locations available through the EPA Geospatial Data Access Project.	EPA	EPA	conterminous US, AK, HI, and US territories	point	not applicable	YES	N/A
173	Land	Assessment, Cleanup, and Redevelopment Exchange (ACRES) Brownfield Sites	Brownfield site locations available through the EPA Geospatial Data Access Project.	EPA	EPA	conterminous US, AK, HI, and US territories	point	not applicable	YES	N/A
175	Land	Section Seven Tracking System (SSTS) Pesticide Producing Site Locations	SSTS Pesticide Producing site locations available through the EPA Geospatial Data Access Project.	EPA	EPA	conterminous US, AK, HI, and US territories	point	not applicable	YES	N/A
188	Land	TOXMAP Toxics Release Inventory (TRI) and Superfund Data	TOXMAP ( <a href="http://toxmap.nlm.nih.gov">http://toxmap.nlm.nih.gov</a> ) is a Geographic Information System (GIS) from the Division of Specialized Information Services ( <a href="http://sis.nlm.nih.gov">http://sis.nlm.nih.gov</a> ) of the US National Library of Medicine (NLM) ( <a href="http://www.nlm.nih.gov">http://www.nlm.nih.gov</a> ) that uses maps of the United States to help users visually explore data from the US Environmental Protection Agency Toxics Release Inventory (TRI) and Superfund Program. All data are available from one data access webpage.	EPA	US National Library of Medicine	conterminous US, AK, and HI	point	not applicable	YES	N/A
GEOLOGY / MINING										
101	Land	Mineral Resources Data System (MRDS)	Mineral Resources Data System (MRDS) describes metallic and nonmetallic mineral resources throughout the world.	USGS	USGS	world, mostly US	point	not applicable	NO	Missing data
102	Land	National Geochemical Survey (NGS)	Geochemical data (arsenic, selenium, mercury, lead, zinc, copper, aluminum, sodium, magnesium, phosphorus, calcium, titanium, manganese, and iron) for US based primarily on stream sediments.	USGS	USGS	conterminous US	county	not applicable	YES	N/A
108	Land	Active Mines and Mineral Processing Plants 2003	Mineral and metal operations in the US 2003. Represents commodities monitored by the USGS Minerals Information Team (MIT) and considered active in 2003.	USGS	USGS	US	point	not applicable	NO	Represented elsewhere
109	Land	Mine Claim Activity on Federal Lands	Public Land Survey section polygons with mining claims recorded in US Bureau of Land Management's LR2000 database as of Dec 12, 2005.	BLM	USGS	AZ, AK, AR, CA, CO, FL, ID, MT, NE, NM, NV, ND, OR, SD, UT, WA, WY	not available	not applicable	NO	Non-informative
182	Land	Coal Fields of the United States	Areas that contain significant coal deposits in Alaska and conterminous US.	USGS	USGS	conterminous US and AK	not available	not applicable	NO	Spatial coverage



Land Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
183	Land	Oregon and Washington Abandoned Mine Lands	This data set contains known abandoned hardrock mines on or affecting lands administered by BLM in Oregon and Washington.	BLM	BLM	OR and WA	point	not applicable	NO	Spatial coverage
184	Land	EPA Uranium Location Database (ULD) Compilation	EPA compilation of mine location information from federal, state, and Tribal agencies into a single database as part of its investigation into the potential environmental hazards of wastes from abandoned uranium mines in the western United States. Map feature service ( <a href="http://www.geocommunicator.gov">http://www.geocommunicator.gov</a> ) which can be used to display and obtain abandoned mine locations, BLM sites including recreation, administrative, campgrounds, and buildings, BLM issued land and mineral authorizations, mining claims, land and mineral title records, roads, surface management agency data, impaired watersheds, and Section 303 listed waters as well as many other reference themes and base maps.	EPA	EPA	conterminous US and AK	point	not applicable	NO	Spatial coverage
196	Land	GeoCommunicator National Integrated Land System (NILS)	recreation, administrative, campgrounds, and buildings, BLM issued land and mineral authorizations, mining claims, land and mineral title records, roads, surface management agency data, impaired watersheds, and Section 303 listed waters as well as many other reference themes and base maps.	BLM	BLM	conterminous US and AK	point	not applicable	NO	Represented elsewhere
197	Land	Generalized Geologic Map of the Conterminous US	This data set contains boundaries and tags for major geologic units in the conterminous United States.	USGS	USGS	conterminous US	not available	not applicable	NO	Non-informative
199	Land	Map of Radon Zones (EPA)	The EPA Radon Zone map identifies areas of the US with the potential for elevated indoor radon levels. Each US county (3141) is assigned to one of three zones based on radon potential.	EPA	EPA	conterminous US, AK, and HI	county	not applicable	YES	N/A
LAND COVER / LAND USE / VEGETATION / SOILS										
103	Land	National Land Cover Database (NLCD 2001) - Land Cover	National Land Cover Database - land cover based on multi-season Landsat 5 and 7 imagery.	USGS	USGS	conterminous US, AK, HI, and Puerto Rico	30m cell	30m	NO	Non-informative
104	Land	National Land Cover Database (NLCD 2001) - Impervious Surface	National Land Cover Database - impervious surface based on multi-season Landsat 5 and 7 imagery.	USGS	USGS	conterminous US, AK, HI, and Puerto Rico	30m cell	30m	NO	Non-informative
105	Land	National Land Cover Database (NLCD 2001) - Canopy Density	National Land Cover Database - canopy density based on multi-season Landsat 5 and 7 imagery.	USGS	USGS	conterminous US, AK, HI, and Puerto Rico	30m cell	30m	NO	Non-informative
106	Land	US General Soil Map (STATSGO2)	Broad-based inventory of soils and non-soil areas that occur in a repeatable pattern on the landscape. National Resources Conservation Service (NRCS) - USDA.	USDA	USDA	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	grouped soil study units	not applicable	NO	Non-informative
107	Land	Soil Survey Geographic (SSURGO) Database	Most detailed level of soil mapping done by National Resources Conservation Service (NRCS) - USDA.	USDA	USDA	conterminous US, AK, HI, Puerto Rico, and Virgin Islands	soil study units	not applicable	NO	Non-informative
110	Land	National Resource Inventory (NRI) 1997	Natural resource conditions and trends on nonfederal US lands. Provides data on landuse, soil erosion, water quality, and wetlands.	NRCS	NRCS	US	point	not applicable	NO	Non-informative
111	Land	National Resource Inventory (NRI) 2003	The National Resources Inventory (NRI) is a statistical survey of natural resource conditions and trends on non-Federal land in the United States — non-Federal land includes privately owned lands, tribal and trust lands, and lands controlled by state and local governments.	NRCS	NRCS	US	point	not applicable	NO	Non-informative
112	Land	GAP Analysis Project - Northwest	Northwest Land Cover Data	USGS	USGS	by state (OR, WA, ID, MT, WY) or by mapzone	not available	not applicable	NO	Spatial coverage
113	Land	GAP Analysis Project - Southwest	Multi-institutional cooperative effort to map and assess biodiversity for a five-state region (AZ, CO, NV, NM, UT) comprising approximately 560,000 square miles in the southwestern US.	USGS	USGS	by state (AZ, CO, NV, NM, UT)	not available	not applicable	NO	Spatial coverage
114	Land	GAP Analysis Project - Southeast	Provisional land cover data	USGS	USGS	by state (AL, FL, GA, KY, MS, NC, SC, TN, VA)	not available	not applicable	NO	Spatial coverage
115	Land	GAP - California Land Cover	GAP land cover mapping - 2008 for California	USGS	USGS	mapzone or entire state (CA)	not available	not applicable	NO	Spatial coverage
116	Land	GAP Land Cover Data - various states	GAP landcover data that are not available through GAP regional websites.	USGS	USGS	by state - see notes.	not available	not applicable	NO	Spatial coverage

Land Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
158	Land	Enhanced Historical Land Use and Land Cover Data Sets of the US Geological Survey	This data set depicts land use and land cover from the 1970s and 1980s and has been previously published by the U.S. Geological Survey (USGS) in other file formats. This version has been reformatted to other file formats and includes minor edits applied by the U.S. Environmental Protection Agency (USEPA) and USGS scientists. This data set was developed to meet the needs of the USGS National Water-Quality Assessment (NAWQA) Program.	USGS	USGS	conterminous US, AK, and HI	30m cell - for raster version	30m	NO	Temporal coverage
180	Land	Forest Cover Types	Contains the broad distribution of various tree types found in the United States and Puerto Rico.	USFS	USGS	conterminous US, AK, HI, and Puerto Rico	unknown	unknown	NO	Non-informative
REGIONS / WATERSHEDS										
155	Land	Omernik (EPA) Ecological Regions of North America Levels 1, 2, and 3	Level I: North America has been divided into 15 broad, level I ecological regions. Level II: The 50 level II ecological regions that have been delineated are intended to provide a more detailed description of the large ecological areas nested within the level I regions. For example, the Tropical Wet Forests of level I is the region covering coastal portions of the United States and Mexico, and is composed of six level II regions. Level III: Level III mapping describes smaller ecological areas nested within level II regions. At level III, the continent currently contains 182 ecological regions.	EPA	EPA	North America	ecoregion	not applicable	NO	Non-informative
156	Land	Omernik (EPA) Ecoregions of the Conterminous US Level III	Ecoregion boundaries were determined by examining patterns of vegetation, animal life, geology, soils, water quality, climate, and human land use, as well as other living and non-living ecosystem components. Designed to serve as a spatial framework for environmental resource management, ecoregions denote areas within which ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. The most immediate needs are to develop regional biological criteria and water quality standards and to set management goals for nonpoint source pollution.	EPA	EPA	conterminous US	ecoregion	not applicable	NO	Non-informative
157	Land	Omernik (EPA) Ecoregions of the Conterminous US Level IV	Ecoregion boundaries were determined by examining patterns of vegetation, animal life, geology, soils, water quality, climate, and human land use, as well as other living and non-living ecosystem components. Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. They are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. By recognizing the spatial differences in the capacities and potentials of ecosystems, ecoregions stratify the environment purpose regions are critical for structuring and implementing ecosystem management strategies across federal agencies, state agencies, and nongovernment same geographical areas (Omernik and others, 2000).	EPA	EPA	conterminous US	ecoregion	not applicable	NO	Non-informative
176	Land	Watershed Boundary Dataset (WBD)	Watershed boundaries define the aerial extent of surface water drainage to a point. The intent of defining hydrologic units (HU) for the Watershed Boundary Dataset is to establish a base-line drainage boundary framework, accounting for all land and surface areas.	NRCS	NRCS	conterminous US, AK, and HI	watershed	not applicable	NO	Non-informative
177	Land	National Hydrography Dataset (NHD) Plus Catchments (not smoothed)	NHDPlus catchments form the basis of the NHDPlus data model. Based on USGS 1:100,000 quad maps, NHDPlus catchments are highly complex polygons posing a challenge for analysis or display. See map at: <a href="http://www.epa.gov/waters/doc/auxiliary/hydroregions.html">http://www.epa.gov/waters/doc/auxiliary/hydroregions.html</a> for comparison to smoothed NHDPlus catchments.	EPA	EPA	conterminous US and HI	catchment	not applicable	NO	Represented elsewhere

Land Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
178	Land	National Hydrography Dataset (NHD) Plus Catchments (smoothed)	NHDPlus catchments form the basis of the NHDPlus data model. Based on USGS 1:100,000 quad maps, Smoothed catchments and hydroregions are a generalized version of the original NHDPlus catchment data, with roughly 85% fewer vertices. Useful for display purposes or for determining the NHDPlus hydrologic region of a feature. Note that the generalization process may result in inaccurate analysis results along the smoothed feature borders. Users should weigh the performance gain versus accuracy loss when utilizing smoothed NHDPlus layers. See map at: <a href="http://www.epa.gov/waters/doc/auxiliary/hydroregions.html">http://www.epa.gov/waters/doc/auxiliary/hydroregions.html</a> for comparison to non-smoothed NHDPlus catchments.	EPA	EPA	conterminous US and HI	catchment	not applicable	NO	Represented elsewhere
179	Land	Bailey's (USDA) Ecoregions and Subregions of the US, Puerto Rico, and the US Virgin Islands	Ecoregions defined by common climatic and vegetation characteristics, shown as domains, divisions, provinces and sections.	USDA	USGS	conterminous US, AK, HI, and US territories	ecoregion	not applicable	NO	Non-informative
181	Land	Federal Lands	Lands owned or administered by the Federal government.	USGS	USGS	conterminous US, AK, HI, and US territories	not available	not applicable	NO	Spatial coverage
117	Land	Protected Areas Database of the US (PAD-US)	National database of federal and state conservation lands.	USGS	USGS	US	not available	not applicable	NO	Spatial coverage
198	Land	Ecological Subregions: Sections and Subsections for the Conterminous US (ECOMAP)	This data set includes polygons for ecological sections and subsections within subregions within the conterminous United States. This data set contains regional geographic delineations for analysis of ecological relationships across ecological units.	USDA	USDA	conterminous US	ecological subsection	not applicable	NO	Non-informative
URBAN / RURAL DESIGNATIONS										
189	Land	Rural-Urban Commuting Area Codes by Census Tract or ZIP Code	The Rural-Urban commuting area (RUCA) codes, a detailed and flexible scheme for delineating sub-county components of the US settlement system, have been updated using data from the 2000 decennial census.	USDA	USDA	conterminous US, AK, and HI	census tract	not applicable	NO	Represented elsewhere
190	Land	Census 2000 Urbanized Area and Urban Cluster Boundaries	Urbanized Areas and Urban Clusters (2000 Census) used by the Census Bureau to tabulate data for urban and rural populations.	Census Bureau	Census Bureau	conterminous US, AK, and HI	urban area	not applicable	NO	Represented elsewhere

## Socio-demographic Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
CENSUS DATA										
211	Social Environment	Residential Density; Population Density	population and residential density at various geographies	USCB	USCB	nationwide	block	not applicable	YES	N/A
212	Social Environment	Total Working Population	employed population (>age 16) / total population (>age 16)	USCB	USCB	nationwide	block	not applicable	NO	Represented elsewhere
213	Social Environment	Non-white population	non-white population	USCB	USCB	nationwide	block	not applicable	NO	Represented elsewhere
214	Social Environment	Immigrant Concentration	% pop Hispanic, foreign-born and with limited English	USCB	USCB	nationwide	block	not applicable	YES	N/A
215	Social Environment	Segregation	isolation and dissimilarity indices	USCB	USCB	nationwide	block	not applicable	NO	Represented elsewhere
216	Social Environment	Mean Number of Units	average number of units in the tract	USCB	USCB	nationwide	tract	not applicable	NO	Represented elsewhere
217	Social Environment	Education	proportion of population with college + education	USCB	USCB	nationwide	block	not applicable	YES	N/A
218	Social Environment	Economic Advantage	% total pop in poverty, % pop 65+ in poverty; % hh on public assistance; unemployment rate; % housing units without a vehicle; % black population	USCB	USCB	nationwide	block	not applicable	NO	Represented elsewhere
219	Social Environment	Economic Disadvantage	low income, low education, high unemployment, unskilled occupations	USCB	USCB	nationwide	block	not applicable	YES	N/A
220	Social Environment	Economic Disadvantage	Sampson index (FHH, poverty, PA, unemp)	USCB	USCB	nationwide	block	not applicable	NO	Represented elsewhere
221	Social Environment	Income / Wealth	income to poverty level (< 185%)	USCB	USCB	nationwide	block	not applicable	YES	N/A
222	Social Environment	Residential Stability	percent living in same house since 1995; median years in residence	USCB	USCB	nationwide	block	not applicable	NO	Non-informative
223	Social Environment	Home Occupancy Status	owner occupied, renter occupied, vacant	USCB	USCB	nationwide	block	not applicable	YES	N/A
224	Social Environment	Home Age	year structure built	USCB	USCB	nationwide	block	not applicable	NO	Represented elsewhere
225	Social Environment	Pre - 1950s Housing	median home built	USCB	USCB	nationwide	block	not applicable	NO	Represented elsewhere
226	Social Environment	1950 - 1969 Housing	median home built	USCB	USCB	nationwide	block	not applicable	NO	Represented elsewhere
227	Social Environment	Post 1969 Housing	median home built	USCB	USCB	nationwide	block	not applicable	NO	Represented elsewhere
228	Social Environment	Commuting Method	percent labor force (16+) reports driving alone to work	USCB	USCB	nationwide	block	not applicable	YES	N/A
229	Social Environment	Proportion Working in County of Residence	number reporting working in county of residence (< age 16) / total county population (> age 16)	USCB	USCB	nationwide	block	not applicable	YES	N/A
230	Social Environment	Aggregate Travel Time to Work	total number of minutes spent in travel to work	USCB	USCB	nationwide	block	not applicable	YES	N/A
231	Social Environment	Median household value	total number of minutes spent in travel to work	USCB	USCB	nationwide	block	not applicable	YES	N/A
232	Social Environment	Median number of rooms	total number of minutes spent in travel to work	USCB	USCB	nationwide	block	not applicable	YES	N/A
233	Social Environment	> 10 housing units	total number of minutes spent in travel to work	USCB	USCB	nationwide	block	not applicable	YES	N/A
CRIME DATA										
234	Social Environment	Crime	Uniform Crime Reports available through FBI	FBI	FBI	nationwide	county	not applicable	NO	Represented elsewhere
235	Social Environment	Violent Crime	number violent + prop per 1k pop	FBI	FBI	nationwide	county	not applicable	YES	N/A
236	Social Environment	Serious Crime	serious crime arrests per 100k	FBI	FBI	nationwide	county	not applicable	NO	Represented elsewhere
DISCRIMINATION DATA										
237	Social Environment	Discriminatory lending practices	home mortgage lending activity	FFIEC	HMDA	nationwide	county	not applicable	NO	Spatial coverage



Built Domain										
ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
TRAFFIC DATA										
181	Built Environment	Vehicle Miles Traveled Per Day	Geospatial layer of vehicle miles traveled per day	state highway systems		not available	not applicable	not applicable	NO	Non-informative
182	Built Environment	Traffic Speed	geospatial layer of posted speed limits	not available	not applicable	not available	not applicable	not applicable	NO	Represented elsewhere
183	Built Environment	Traffic Count	count of traffic volume at over 1,000,000 intersections throughout the US.	TrafficMetrix	TrafficMetrix	nationwide	msa or county	not applicable	NO	Non-informative
184	Built Environment	Street type	Topographically Integrated Geographic Encoding and Referencing data; including road type, proportion, length.	USCB	UCSB	nationwide	block	not applicable	YES	N/A
185	Built Environment	Distance to Public Transportation	not available	not available		not available	not applicable	not applicable	NO	Missing data
186	Built Environment	Pedestrian Fatalities	annual pedestrian fatality per 100k population	NHTSC	FARS	assumed nationwide coverage	county	county-level	YES	N/A
AMENITIES AND DISAMENITIES DATA										
187	Built Environment	Counts of YMCA/ YWCA	count of YMCA/YWCA per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
188	Built Environment	Recreation Density	beaches, pools, tennis courts, recreation centers per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
189	Built Environment	Counts of Parks	parks, recreation areas per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
190	Built Environment	Park Density	park count per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
191	Built Environment	Physical Fitness Facilities, Bicycle Rental Public Golf Courses	physical fitness facilities, bicycle rental public golf courses per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
192	Built Environment	Dance Studios, Basketball, Martial Arts Instruction	dance studios, basketball, martial arts instruction per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
193	Built Environment	Outdoor Recreation	outdoor activities; sport, recreational camps per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
194	Built Environment	Gym Memberships	athletic club and gymnasiums, tennis, basketball per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
195	Built Environment	Fast Food Density	fast food density per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
198	Built Environment	School Density	school count per block group per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
199	Built Environment	Low Income / Subsidized Housing	counts of low income and subsidized housing units per unit aggregation	HUD	HUD	nationwide	housing authority reporting area	housing authority reporting area	YES	N/A
202	Built Environment	Restaurant Density	number of restaurants + / 10k pop per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
203	Built Environment	Grocery Store Density	number of groceries, sm / 10k pop per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
204	Built Environment	Convenience Store Density	number of convenience stores/ 10k pop per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
205	Built Environment	Specialty Food Density	number of specialty food markets/ 10k pop per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
206	Built Environment	Vice-related Density	count of vice-related businesses / 10k population per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A

## Built Domain

ID	Environmental Medium	Data Title	Data Description (brief)	Agency with Data Ownership	Agency Providing Data	Geographic Area of Coverage	Smallest Geographical Unit Represented	Data Resolution	Used for EQI	Reason for non-use
207	Built Environment	Entertainment-related Density	count of entertainment-related businesses / 10k population per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
208	Built Environment	Health-care-related Density	count of health care-related businesses / 10k population per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
209	Built Environment	Social service-related Density	count of social service-related businesses / 10k population per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
210	Built Environment	Transportation-related density	count of transportation-related businesses / 10k population per unit aggregation	Dun & Bradstreet	Dun & Bradstreet	nationwide	block group	block group	YES	N/A
LAND USE DATA										
200	Built Environment	Land Use Mix	tertiles of number of land uses per acre	USCB	USCB	nationwide	block	not applicable	NO	Represented elsewhere
201	Built Environment	Mixed Land Use	land uses per acre	USCB	USCB	nationwide	block	not applicable	NO	Represented elsewhere
OTHER DATA										
196	Built Environment	Lead Poisoning - Children	percent children tested positive for lead poisoning	DHFS	DHFS	not available	not available	county	NO	Represented elsewhere
197	Built Environment	Radon Levels	radon levels (EPA)	DHFS	DHFS	not available	not available	county	NO	Represented elsewhere

# Appendix II

## Identified Variables by Source for Each Domain

Variables of Interest (Air Domain)					
Air quality system (AQS)					
Variable	Variable Name	Counties/Monitors	Variable Notes	EQI?	Notes
Particulate Matter <10 microns in aerodynamic diameter (PM <sub>10</sub> )	A_PM <sub>10</sub> _mean_In	3141 / 303	µg/m <sup>3</sup> , log-transformed	YES	
Particulate Matter <2.5 microns in aerodynamic diameter (PM <sub>2.5</sub> )	A_PM <sub>2.5</sub> _mean	3141 / 1146	µg/m <sup>3</sup>	YES	
Nitrate (NO <sub>3</sub> <sup>-</sup> )	A_NO <sub>3</sub> _mean_In	3141 / 442	ppb, log-transformed	YES	
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	A_SO <sub>4</sub> _mean_In	3141 / 575	ppb, log-transformed	YES	
Ozone (O <sub>3</sub> )	A_O <sub>3</sub> _mean_In	3141 / 1187	ppm, log-transformed	YES	
Carbon Monoxide (CO)	A_CO_mean_In	3141 / 499	ppm, log-transformed	YES	

Notes: Raw data is from monitoring stations across the country, daily and hourly values downloaded and averaged to yearly (2000-2005) for each monitoring station/pollutant. Averaged data were then kriged to get a value for each county centroid.

Variables of Interest (Air Domain)					
National Air Toxics Assessment (NATA)					
Variable	Variable Name	Counties (Missing/Zeros)	Variable Notes	EQI?	Notes
1,1,1-Trichloroethane		3141 (0/0)		No	High Correlation
1,1,2,2-Tetrachloroethane	A_TeCA_In	3141 (0/0)		Yes	
1,1,2-Trichloroethane	A_112TCA_In	3141 (0/142)		Yes	
1,1-Dimethylhydrazine	A_UDMH_In	1014 (2127/985)		No	Zeros
1,2,3,4,5,6-Hexachlorocyclohexane	A_HCCH_In	182 (2201/742)		No	Zeros
1,2,4-Trichlorobenzene	A_124TCIB_In	3141 (0/119)		No	High Correlation
1,2-Dibromo-3-chloropropane	A_DBCP_In	3141 (0/0)		Yes	
1,2-Diphenylhydrazine		92 (3049/77)		No	Zeros
1,2-Epoxybutane		2373 (768/1996)		No	Zeros
1,2-Propyleneimine		885 (2256/806)		No	Zeros
1,3-Butadiene		3141 (0/0)		No	High Correlation
1,3-Dichloropropene		3062 (79/1297)		No	High Correlation
1,4-Dichlorobenzene		3141 (0/0)		No	High Correlation
1,4-Dioxane	A_dioxane_In	3038 (180/2065)		No	Zeros
2,2,4-Trimethylpentane		3141 (0/0)		No	High Correlation
2,4,5-Trichlorophenol	A_245TCP_In	1256 (1885/1119)		No	Zeros
2,4,6-Trichlorophenol	A_246TCP_In	2222 (919/1730)		No	Zeros
2,4-D salts and esters		2141 (1000/1192)		No	Zeros
2,4-Dinitrophenol	A_DNP_In	2763 (378/1934)		No	Zeros
2,4-Dinitrotoluene		3141 (0/125)		No	High Correlation
2,4-Toluene diamine		1223 (1918/1118)		No	Zeros
2,4-Toluene diisocyanate	A_TDI_In	3141 (0/0)		Yes	
2-Chloroacetophenone	A_2Clacphen_In	3094 (47/1155)		Yes	
2-Nitropropane	A_2NP_In	3141 (0/144)		Yes	
3,3-Dichlorobenzidine		3062 (79/1297)		No	Zeros
3,3-Demthoxybenzidine		317 (2824/300)		No	Zeros
3,3-Dimethylbenzidine		660 (2481/605)		No	Zeros
4,4-Methylene bis-2-chloroaniline		1285 (1856/1196)		No	Zeros
4,4-Methylenedianiline		1964 (1177/1668)		No	Zeros
4,4-Methylenediphenyl diisocyanate		3141 (0/0)		No	High Correlation
4-Aminobiphenyl		444 (2697/415)		No	Zeros
4-Dimethylaminoazobenzene		344 (2797/320)		No	Zeros
4-Nitrobiphenyl		627 (2514/576)		No	Zeros
4-Nitrophenol	A_PNP_In	3140 (1/34)		Yes	
Acetaldehyde		3141 (0/0)		No	High Correlation
Acetamide	A_Acetamide_In	2451 (690/1054)		No	Zeros

Notes: When data is missing/not recorded, zero values were deemed appropriate. Most variables kept for EQI have been log-transformed. EQI 2000 = NATA 1999; EQI 2001, 2002, 2003 = NATA 2002; EQI 2004, 2005 = NATA 2005. All variables reported in tons emitted per year. Unless otherwise noted, all variables are log-transformed. Variables were dropped due to insufficient data (high numbers of missing or zero observations) or due to high correlation with other variables.

**Variables of Interest (Air Domain)**
**National Air Toxics Assessment (NATA)**

Variable	Variable Name	Counties (Missing/Zeros)	Variable Notes	EQI?	Notes
Acetonitrile	A_CH3CN_In	3141 (0/106)		Yes	
Acetophenone	A_Acetophenone_In	3140 (1/3)		Yes	
Acrolein	A_Acrolein_In	3141 (0/0)		Yes	
Acrylamide	A_Acrylamide_In	2789 (352/2226)		No	Zeros
Acrylic acid	A_Acrylic_acid_In	3108 (1165)		Yes	
Acrylonitrile	A_C3H3N_In	3141 (0/0)		Yes	
Allyl chloride		3141 (0/215)		No	High Correlation
Aniline	A_Aniline_In	2846 (295/2073)		No	Zeros
Anisidine		899 (2242/856)		No	Zeros
Antimony compounds	A_Sb_In	3136 (5/199)		Yes	
Arsenic compounds		3141 (0/0)		No	High Correlation
Asbestos	A_Asbestos_In	1349 (1792/1168)		No	Zeros
Benzene		3141 (0/0)		No	High Correlation
Benzidine	A_Benzidine_In	3141 (0/0)		Yes	
Benzotrithloride		647 (2494/591)		No	Zeros
Benzyl chloride	A_Benzyl_Cl_In	3141 (0/98)		Yes	
Beryllium compounds	A_Be_In	3141 (0/0)		Yes	
β-Propiolactone		128 (3013/118)		No	Zeros
Biphenyl	A_biphenyl_In	3141 (0/0)		Yes	
bis-2-Ethylhexyl phthalate	A_DEHP_In	3141 (0/0)		Yes	
bis-Chloromethyl ether		701 (2440/643)		No	Zeros
Bromoform	A_Bromoform_In	3094 (47/1108)		Yes	
Cadmium compounds	A_Cd_In	3141 (0/0)		Yes	
Calcium cyanamide		315 (2826/279)		No	Zeros
Captan		1503 (1638/1018)		No	Zeros
Carbaryl		1203 (1938/797)		No	Zeros
Carbon disulfide	A_CS2_In	3141 (0/0)		Yes	
Carbon tetrachloride	A_CCl4	3141 (0/0)	Not log-transformed	Yes	
Carbon sulfide	A_CS_In	3141 (0/8)		Yes	
Catechol		2056 (1085/1711)		No	Zeros
Chlordane		1075 (2066/1001)		No	Zeros
Chlorine	A_Cl_In	3114 (27/520)		Yes	
Chloroacetic acid		1815 (1326/1594)		No	Zeros
Chlorobenzene	A_C6H5Cl_In	3141 (0/0)		Yes	
Chlorobenzilate		483 (2658/447)		No	Zeros
Chloroform	A_chloroform_In	3141 (0/0)		Yes	
Chloromethyl methyl ether		1279 (1862/1157)		No	Zeros
Chloroprene	A_Chloroprene_In	3141 (220)		Yes	
Chromium compounds	A_Cr_In	3141 (0/0)		Yes	
Cobalt compounds		3136 (5/135)		No	High Correlation
Coke oven emissions		985 (2156/842)		No	Zeros
Cresol/cresylic acid	A_Cresol_In	3141 (0/0)		Yes	
Cumene	A_Cumene_In	3141 (0/0)		Yes	
Cyanide compounds	A_CN_In	3141 (0/5)		Yes	
DDE		276 (2865/265)		No	Zeros
Diazomethane		43 (3098/37)		No	Zeros
Dibenzofuran	A_Dibenzofuran_In	2543 (598/1906)		No	Zeros
Dibutylphthalate	A_DBP_In	3140 (1/0)		Yes	
Dichloroethyl ether		1466 (1675 / 1045)		No	Zeros
Dichlorvos		342 (2799 / 296)		No	Zeros
Diesel engine emissions	A_Diesel_In	3141 (0/0)		Yes	
Diethanolamine	A_DEA_In	3063 (78/1651)		No	Zeros
Diethyl sulfate	A_Et2SO4_In	1418 (1723/1240)		No	Zeros
Dimethyl formamide	A_DMF_In	3140 (1/228)		Yes	
Dimethyl phthalates	A_Me2_phthalate_In	3140 (1/0)		Yes	
Dimethyl sulfate	A_Me2SO4_In	3141 (0/136)		Yes	
Dimethylcarbamoyl chloride		528 (2613/505)		No	Zeros
Epichlorohydrin	A_ECH_In	3141 (0/183)		Yes	

Notes: When data is missing/not recorded, zero values were deemed appropriate. Most variables kept for EQI have been log-transformed. EQI 2000 = NATA 1999; EQI 2001, 2002, 2003 = NATA 2002; EQI 2004, 2005 = NATA 2005. All variables reported in tons emitted per year. Unless otherwise noted, all variables are log-transformed. Variables were dropped due to insufficient data (high numbers of missing or zero observations) or due to high correlation with other variables.



## Variables of Interest (Air Domain)

### National Air Toxics Assessment (NATA)

Variable	Variable Name	Counties (Missing/Zeros)	Variable Notes	EQI?	Notes
Ethyl acrylate	A_Elacrylate_In	3141 (0/160)		Yes	
Ethyl carbamate chloride		1121 (2020/1053)		No	Zeros
Ethyl chloride	A_EtCl_In	3140 (1/0)		Yes	
Ethylbenzene		3141 (0/0)		No	High Correlation
Ethylene dibromide	A_EDB_In	3141 (0/0)		Yes	
Ethylene dichloride	A_EDC_In	3141 (0/0)		Yes	
Ethylene glycol	A_EGLY_In	3141 (0/0)		Yes	
Ethylene oxide	A_EOx_In	3141 (0/0)		Yes	
Ethylene thiourea		877 (2264/735)		No	Zeros
Ethyleneimine		671 (2470/591)		No	Zeros
Ethylidene dichloride	A_EdCl2_In	3140 (1/27)		Yes	
Fine mineral fibers		744 (2397/658)		No	Zeros
Formaldehyde		3141 (0/0)		No	High Correlation
Glycol ethers	A_Glycol_ethers_In	3138 (3/616)		Yes	
Heptachlor		812 (2329/732)		No	Zeros
Hexachlorobenzene	A_HCB_In	3141 (0/148)		Yes	
Hexachlorobutadiene	A_HCBD_In	3141 (0/426)		Yes	
Hexachlorocyclopentadiene	A_HCCPD_In	3141 (0/426)		Yes	
Hexachloroethane	A_PCA_In	1768 (1373/1496)		No	Zeros
Hexamethylene diisocyanate	A_HDI_In	2927 (214/1826)		No	Zeros
Hexamethylphosphoramide		32 (3109/28)		No	Zeros
Hexane	A_Hexane_In	3141 (0/0)		Yes	
Hydrazine	A_N2H2_In	3141 (0/0)		Yes	
Hydrochloric acid	A_HCl_In	3141 (0/0)		Yes	
Hydrogen fluoride (hydrofluoric acid)		3141 (0/0)		No	High Correlation
Hydroquinone	A_quinol_In	3137 (4/1929)		No	Zeros
Isophorone	A_Isophorone_In	3135 (6/287)		Yes	
Lead compounds	A_Pb_In	3141 (0/0)		Yes	
Maleic anhydride	A_Maleic_anhyd_In	2825 (316/1917)		No	Zeros
Manganese compounds	A_Mn_In	3141 (0/0)		Yes	
Mercury compounds	A_Hg_In	3141 (0/0)		Yes	
Methanol	A_MeOH_In	3141 (0/0)		Yes	
Methoxychlor		1023 (2118/924)		No	Zeros
Methyl bromide		3141 (0/0)		No	High Correlation
Methyl chloride		3141 (0/0)		No	High Correlation
Methyl iodide	A_MeI_In	2522 (619/1805)		No	Zeros
Methyl isobutyl ketone	A_MIBK_In	3141 (0/0)		Yes	
Methyl isocyanate		1084 (2057/988)		No	Zeros
Methyl methacrylate	A_MMA_In	3141 (0/0)		Yes	
Methyl chloride	A_MeCl_In	3141 (0/0)		Yes	
Methylhydrazine	A_Mehydrazine_In	3094 (47/1151)		Yes	
MTBE	A_MTBE_In	3141 (0/0)		Yes	
Napthalene		3141 (0/0)		No	High Correlation
Nickel compounds		3141 (0/0)		No	High Correlation
Nitrobenzene	A_nitrobenzene_In	3141(0/211)		Yes	
N,N-Dimethylaniline	A_DMA_In	3141 (0/209)		Yes	
N-Nitrosodimethylamine	A_NDMA_In	653 (2488/571)		No	Zeros
N-Nitrosomorpholine		920 (2221/840)		No	Zeros
o-Toluidine	A_otoluidine_In	3141 (0/176)		Yes	
PAH/POM	A_PAHPOM_In	3141 (0/0)		Yes	
Parathion		249 (2892/234)		No	Zeros
Pentachlorophenol	A_PCP_In	3141 (0/171)		Yes	
Phenol		3141 (0/0)		No	High Correlation
Phosgene		1668 (1473/1328)		No	Zeros
Phosphine	A_PH3_In	3049 (92/380)		Yes	
Phosphorus	A_P_In	3052 (89/1255)		Yes	
Phthalic anhydride		2957 (184/2082)		No	Zeros
Polychlorinated biphenyls	A_PCBs_In	3141 (0/98)		Yes	

Notes: When data is missing/not recorded, zero values were deemed appropriate. Most variables kept for EQI have been log-transformed. EQI 2000 = NATA 1999; EQI 2001, 2002, 2003 = NATA 2002; EQI 2004, 2005 = NATA 2005. All variables reported in tons emitted per year. Unless otherwise noted, all variables are log-transformed. Variables were dropped due to insufficient data (high numbers of missing or zero observations) or due to high correlation with other variables.

**Variables of Interest (Air Domain)**
**National Air Toxics Assessment (NATA)**

Variable	Variable Name	Counties (Missing/Zeros)	Variable Notes	EQI?	Notes
p-phenylenediamine		1264 (1877/1115)		No	Zeros
Propionaldehyde		3141 (0/0)		No	High Correlation
Propoxur		706 (2435/648)		No	Zeros
Propylene dichloride	A_ProCl2_In	3141 (0/0)		Yes	
Propylene oxide	A_ProO_In	3141 (0/86)		Yes	
Quinoline	A_Quinolin_In	3141 (0/0)		Yes	
Quinone		77 (3064/59)		No	Zeros
Radionuclides		131 (3010/88)		No	Zeros
Selenium compounds	A_Se_In	3141 (0/0)		Yes	
Styrene	A_Styrene_In	3141 (0/0)		Yes	
Styrene oxide		696 (2445/660)		No	Zeros
Tetrachloroethylene	A_Cl4C2_In	3141 (0/0)		Yes	
Titanium tetrachloride		1656 (1485/1440)		No	Zeros
Toluene	A_Toluene_In	3141 (0/0)		Yes	
Toxaphene	A_Toaxaphene_In	814 (2327/762)		No	Zeros
Trichloroethylene	A_C2HCl3_In	3141 (0/0)		Yes	
Triethylamine	A_Et3N_In	3141 (0/0)		Yes	
Trifluralin	A_Trifluralin_In	2529 (612/1628)		No	Zeros
Vinyl acetate	A_VyAc_In	3141 (0/0)		Yes	
Vinyl bromide		392 (2749/377)		No	Zeros
Vinyl chloride	A_VyCl_In	3411 (0/4)		Yes	
Vinylidene chloride	A_11DCE_In	3411 (0/4)		Yes	
Xylenes		3141 (0/0)		No	High Correlation
Pentachloronitrobenzene (PCNB)		687 (2454/637)		No	Zeros
1,3-Propoane sultone		637 (2504/599)		No	Zeros

Notes: When data is missing/not recorded, zero values were deemed appropriate. Most variables kept for EQI have been log-transformed. EQI 2000 = NATA 1999; EQI 2001, 2002, 2003 = NATA 2002; EQI 2004, 2005 = NATA 2005. All variables reported in tons emitted per year. Unless otherwise noted, all variables are log-transformed. Variables were dropped due to insufficient data (high numbers of missing or zero observations) or due to high correlation with other variables.

Variables of Interest (Water Domain)					
WATERS Program Database/REACH Address Database					
Variable	Variable Name	Counties (Missing/Zeros)	Variable Notes	EQI?	Notes
Percent of stream length impaired in county	D303_Percent	2513 (628/0)	Calculated with REACH database information	Yes	
Sewage permits per 1000 km of stream in county	SEWAGENPDESperKM	3141 (0/0)	Total of AFO/CAFO NPDES permits, CSO NPDES permits, sludge NPDES permits in county	Yes	
Industrial permits per 1000 km of stream in county	INDNPDESperKM	3141 (0/0)	Total of pretreatment NPDES permits, general facilities NPDES permits, individual facilities NPDES permits, unpermitted by county	Yes	
Stormwater permits per 1000 km of stream in county	STORMNPDESperKM	3141 (0/0)	Total of general stormwater NPDES permits, industrial stormwater NPDES permits by county	Yes	
Number of days closed per event in county 2002	numDays_Close_Activity_2002	54 (0/3087)	Count of days of beach closure in county	Yes	
Number of days per contamination-advisory event in county 2002	numDays_Cont_Activity_2002	66 (0/3075)	Count of days of beach closure for contamination events	Yes	
Number of days per rain advisory event in county 2002	numDays_Rain_Activity_2002	5 (0/3136)	Count of days of beach closure for rain events	Yes	
Percent of stream length in county assigned with Water Quality Standards (WQS)	WQS_Percent	2022 (1119/0)	Calculated with REACH database information	No	Noninformative
Percent of stream length impaired for agriculture	D303_AG_Percent	1168 (1973/0)	Calculated with REACH database information	No	Zeros
Percent of stream length impaired for drinking water	D303_DW_Percent	274 (2867/0)	Calculated with REACH database information	No	Zeros
Percent of stream length impaired for recreation	D303_REC_Percent	1374 (1767/0)	Calculated with REACH database information	No	Zeros
Percent of stream length impaired for wildlife	D303_WILD_Percent	1607 (1534/0)	Calculated with REACH database information	No	Zeros
Percent of stream length impaired for industrial use	D303_IND_Percent	613 (2528/0)	Calculated with REACH database information	No	Zeros
Percent of stream length with assigned WQS impaired for agriculture	D303_WQS_AG_Percent	1166 (1975/0)	Calculated with REACH database information	No	Zeros
Percent of stream length with assigned WQS impaired for drinking water	D303_WQS_DW_Percent	274 (2867/0)	Calculated with REACH database information	No	Zeros
Percent of stream length with assigned WQS impaired for recreational water	D303_WQS_REC_Percent	1373 (1767/0)	Calculated with REACH database information	No	Zeros
Percent of stream length with assigned WQS impaired for wildlife water	D303_WQS_WILD_Percent	1605 (1536/0)	Calculated with REACH database information	No	Zeros
Percent of stream length with assigned WQS impaired for industrial water	D303_WQS_IND_Percent	606 (2535/0)	Calculated with REACH database information	No	Zeros
Number of concentrated animal feeding operations (AFO/CAFOs) National Pollutant Discharge Elimination System (NPDES) permits in county	NPDES_AFOCAFO	257 (2884/0)	Simple count of permits by county	No	Zeros
Number of combined sewer overflows (CSO) NPDES permits in county	NPDES_CSO	427 (2714/0)	Simple count of permits by county	No	Zeros
Number of pretreatment NPDES permits in county	NPDES_PRETREATER	559 (2582/0)	Simple count of permits by county	No	Zeros
Number of sludge NPDES permits in county	NPDES_SLUDGE	260 (2881/0)	Simple count of permits by county	No	Zeros
Number of general facilities NPDES permits in county	NPDES_GENERALFACILITIES	2053 (1088/0)	Simple count of permits by county	No	Zeros
Number of individual facilities NPDES permits in county	NPDES_INDIVIDUAL	2962 (179/0)	Simple count of permits by county	No	Zeros
Number of general stormwater NPDES permits in county	NPDES_STORMWATERGENERAL	1164 (1977/0)	Simple count of permits by county	No	Zeros
Number of industrial stormwater NPDES permits in county	NPDES_STORMWATERIND	260 (2881/0)	Simple count of permits by county	No	Zeros
Number of unpermitted NPDES facilities	NPDES_UNPERMITTED	1285( 1856/0)	Simple count of permits by county	No	Zeros
Number of total NPDES permits in county	NPDES_TOTAL	3072 (69/0)	Simple count of permits by county	No	Zeros

Notes: These measures were computed; because of a lot of missing data, several variables cannot be used. Variables were calculated using the REACH stream-length database.

### Variables of Interest (Water Domain)

#### Estimate Use of Water in the United States

Variable	Variable Name	Counties Missing(Zeros)	Variable Notes	EQI?	Notes
Percent of population on self supply, 2000	Per_TotPopSS_2000	3141 (0/0)	Estimate provided at county level.	Yes	
Percent of public supply Population that is on surface water, 2000	Per_PSWithSW_2000	3067 (74/0)	Estimate provided at county level.	Yes	
Percent of population on Public water supply, 2000	Per_TotPopPS_2000	3141 (0/0)	Estimate provided at county level.	No	High Correlation
Percent of public supply Population that is on groundwater, 2000	Per_PSWithGW_2000	3067 (74/0)	Estimate provided at county level.	No	High Correlation
Percent of self supply Withdrawals from groundwater sources, 2000	Per_SSWithGW_2000	2307 (834/0)	Estimate provided at county level.	No	High Correlation
Percent of self supply Withdrawals from surface water sources, 2000	Per_SSWithSW_2000	2307 (834/0)	Estimate provided at county level.	No	High Correlation
Percent of domestic use from public water supply, 2000	Per_DOPS_2000	3098 (43/0)	Estimate provided at county level.	No	High Correlation
Percent of domestic use from self supply, 2000	Per_DOSS_2000	3098 (43/0)	Estimate provided at county level.	No	High Correlation
Percent of total withdrawals for domestic use, 2000	Per_TotWithDO_2000	2444 (697/0)	Estimate provided at county level.	No	Zeros
Percent of total withdrawals for industrial use, 2000	Per_TotWithIN_2000	2444 (697/0)	Estimate provided at county level.	No	Zeros
Percent of total withdrawals for irrigation use, 2000	Per_TotWithIT_2000	2444 (697/0)	Estimate provided at county level.	No	Zeros
Percent of total withdrawals for livestock use, 2000	Per_TotWithLS_2000	2444 (697/0)	Estimate provided at county level.	No	Zeros
Percent of total withdrawals for aquaculture use, 2000	Per_TotWithLA_2000	2444 (697/0)	Estimate provided at county level.	No	Zeros
Percent of total withdrawals for mining use, 2000	Per_TotWithMI_2000	2444 (697/0)	Estimate provided at county level.	No	Zeros
Percent of total withdrawals for thermoelectric use, 2000	Per_TotWithPT_2000	2444 (697/0)	Estimate provided at county level.	No	Zeros

Notes: These measures were computed for 2000 and 2005 data and averaged. The U.S. Geological Survey provides estimates at county level, so no additional manipulation required.

### Variables of Interest (Water Domain)

#### National Atmospheric Deposition Program

Variable	Variable Name	Counties (Missing/Zeros)	Variable Notes	EQI?	Notes
Calcium precipitation weighted mean (mg/L)	Ca_In	3141 (0/0)	Kriged and log transformed	Yes	
Magnesium precipitation weighted mean (mg/L)	Mg_In	3141 (0/0)	Kriged and log transformed	Yes	
Potassium precipitation weighted mean (mg/L)	K_In	3141 (0/0)	Kriged and log transformed	Yes	
Sodium precipitation weighted mean (mg/L)	Na_In	3141 (0/0)	Kriged and log transformed	Yes	
Ammonium precipitation weighted mean (mg/L)	NH4_mean	3141 (0/0)	Kriged - transformation not needed	Yes	
Nitrate precipitation weighted mean (mg/L)	NO3_mean	3141 (0/0)	Kriged - transformation not needed	Yes	
Chloride deposition	Cl_In	3141 (0/0)	Kriged and log transformed	Yes	
Sulfate deposition	SO4_mean	3141 (0/0)	Kriged - transformation not needed	Yes	
Total mercury deposition (ng/m2) - Use only values with A or B quality rating	Hg_In	3141 (0/0)	Kriged and log transformed	Yes	

Notes: Measures provided at various monitoring stations. Values for 2000-2005 were kriged to national level coverage. Data for all years were averaged together.

### Variables of Interest (Water Domain)

#### Drought Monitor Data

Variable	Variable Name	Counties (Missing/Zeros)	Variable Notes	EQI?	Notes
Percent of county drought – extreme (D3-D4)	D3Condition	3141 (0/0)		Yes	
Percent of county without drought	NoDroughtCondition	3141 (0/0)		No	High Correlation
Percent of county abnormally dry (D0-D4)	D0Condition	3141 (0/0)		No	High Correlation
Percent of county drought - moderate (D1-D4)	D1Condition	3141 (0/0)		No	High Correlation
Percent of county drought - severe (D2-D4)	D2Condition	3141 (0/0)		No	High Correlation
Percent of county drought - exceptional (D4)	D4Condition	3141 (0/0)		No	High Correlation

Notes: Raster data aggregated to the county level. Data for all years 2000-2005 was averaged together.



**Variables of Interest (Water Domain)**
**National Contaminant Occurrence Database**

Variable	Variable Name	Counties (Missing/Zeros)	Variable Notes	EQI?	Notes
Arsenic - average	W_As_In (mg/L)	2017 (1124/0)	Average for all samples in county, log transformed	Yes	
Barium - average	W_Ba_In (mg/L)	1990 (1151/0)	Average for all samples in county, log transformed	Yes	
Cadmium - average	W_Cd_In (mg/L)	1991 (1150/0)	Average for all samples in county, log transformed	Yes	
Chromium (total) - average	W_Cr_In (mg/L)	1989 (1152/0)	Average for all samples in county, log transformed	Yes	
Cyanide - average	W_CN_In (mg/L)	1385 (1765/0)	Average for all samples in county, log transformed	Yes	
Fluoride - average	W_FL_In (mg/L)	2138 (958/0)	Average for all samples in county, log transformed	Yes	
Mercury (inorganic) - average	W_HG_In (mg/L)	2056 (1085/0)	Average for all samples in county, log transformed	Yes	
Nitrate (as N) - average	W_NO3_In (mg/L)	1988 (1153/0)	Average for all samples in county, log transformed	Yes	
Nitrite (as N) - average	W_NO2_In (mg/L)	1583 (1558/0)	Average for all samples in county, log transformed	Yes	
Selenium - average	W_SE_In (mg/L)	1986 (1155/0)	Average for all samples in county, log transformed	Yes	
Antimony - average	W_Sb_In (mg/L)	1994 (1147/0)	Average for all samples in county, log transformed	Yes	
Beryllium - average	W_Be_In (mg/L)	1932 (1209/0)	Average for all samples in county, log transformed	Yes	
Thallium - average	W_Tl_In (mg/L)	1996 (1145/0)	Average for all samples in county, log transformed	Yes	
Endrin - average	W_Endrin_In (µg/L)	1509 (1632/0)	Average for all samples in county, log transformed	Yes	
Lindane - average	W_Lindane_In (mg/L)	1990 (1151/0)	Average for all samples in county, log transformed	Yes	
Methoxychlor - average	W_methoxychlor_In (µg/L)	1512 (1629/0)	Average for all samples in county, log transformed	Yes	
Toxaphene - average	W_Toxaphene_In (µg/L)	1273 (1868/0)	Average for all samples in county, log transformed	Yes	
Dalapon - average	W_Dalapon_In (µg/L)	1292 (1849/0)	Average for all samples in county, log transformed	Yes	
di(2-Ethylhexyl) adipate (DEHA) - average	W_DEHA_In (µg/L)	1456 (1685/0)	Average for all samples in county, log transformed	Yes	
Oxamyl (Vydate) - average	W_Oxamyl_In (µg/L)	1254 (1887/0)	Average for all samples in county, log transformed	Yes	
Simazine - average	W_Simazine_In (µg/L)	1669 (1472/0)	Average for all samples in county, log transformed	Yes	
di(2-Ethylhexyl) phthalate (DEHP) - average	W_DEHP_In (µg/L)	1449 (1692/0)	Average for all samples in county, log transformed	Yes	
Picloram - average	W_Picloram_In (µg/L)	1352 (1789/0)	Average for all samples in county, log transformed	Yes	
Dinoseb - average	W_Dinoseb_In (µg/L)	1347 (1794/0)	Average for all samples in county, log transformed	Yes	
Hexachlorocyclopenta-diene - average	W_HCCPD_In (µg/L)	1518 (1623/0)	Average for all samples in county, log transformed	Yes	
Carbofuran - average	W_Carbofuran_In (µg/L)	1262 (1879/0)	Average for all samples in county, log transformed	Yes	
Atrazine - average	W_atrazine_In (µg/L)	1726 (1415/0)	Average for all samples in county, log transformed	Yes	
Alachlor - average	W_Alachlor_In (µg/L)	1662 (1479/0)	Average for all samples in county, log transformed	Yes	
Heptachlor - average	W_Heptachlor_In (µg/L)	1509 (1632/0)	Average for all samples in county, log transformed	Yes	
Heptachlor epoxide - average	W_Heptachlor_epox_In (µg/L)	1508 (1633/0)	Average for all samples in county, log transformed	Yes	
2,4-D (2,4-Dichlorophenoxyacetic acid) - average	W_24D_In (µg/L)	1360 (1781/0)	Average for all samples in county, log transformed	Yes	
2,4,5-TP (Silvex) - average	W_silvex_In (µg/L)	1348 (1793/0)	Average for all samples in county, log transformed	Yes	
Hexachlorobenzene - average	W_HCB_In (µg/L)	1520 (1621/0)	Average for all samples in county, log transformed	Yes	
Benzo[a]pyrene - average	W_BenzoAP_In (µg/L)	1430 (1711/0)	Average for all samples in county, log transformed	Yes	
Pentachlorophenol - average	W_PCP_In (µg/L)	1547 (1594/0)	Average for all samples in county, log transformed	Yes	
1,2,4-Trichlorobenzene - average	W_124TCIB_In (µg/L)	2239 (902/0)	Average for all samples in county, log transformed	Yes	
Polychlorinated biphenyls (PCBs) - average	W_PCB_In (µg/L)	848 (2293/0)	Average for all samples in county, log transformed	Yes	
1,2-Dibromo-3-chloropropane (DBCP) - average	W_DBCP_In (µg/L)	1652 (1489/0)	Average for all samples in county, log transformed	Yes	
Ethylene dibromide (EDB) - average	W_EDB_In (µg/L)	1630 (1511/0)	Average for all samples in county, log transformed	Yes	
Xylenes (total) - average	W_xylenes_In (µg/L)	2203 (938/0)	Average for all samples in county, log transformed	Yes	
Chlordane - average	W_Chlordane_In (µg/L)	1498 (1652/0)	Average for all samples in county, log transformed	Yes	
Dichloromethane (Methylene chloride) - average	W_DCM_In (µg/L)	2245 (896/0)	Average for all samples in county, log transformed	Yes	

Notes: Will use 6-Year Review 2 (data collected between 1998 and 2005). Calculate the following variables for each chemical for each county (aggregating all public water supply in county) for all years combined, missing for those counties without any data; did not keep detects.

**Variables of Interest (Water Domain)**
**National Contaminant Occurrence Database**

Variable	Variable Name	Counties (Missing/Zeros)	Variable Notes	EQI?	Notes
1,2-Dichlorobenzene (o-Dichlorobenzene) - average	W_ODCB_In (µg/L)	2236 (905/0)	Average for all samples in county, log transformed	Yes	
1,4-Dichlorobenzene (p-Dichlorobenzene) - average	W_PDCB_In (µg/L)	2165 (976/0)	Average for all samples in county, log transformed	Yes	
Vinyl chloride - average	W_VCM_In (µg/L)	2235 (906/0)	Average for all samples in county, log transformed	Yes	
1,1-Dichloroethylene - average	W_11DCE_In (µg/L)	2238 (903/0)	Average for all samples in county, log transformed	Yes	
trans-1,2-Dichloroethylene - average	W_t12DCE_In (µg/L)	2231 (910/0)	Average for all samples in county, log transformed	Yes	
1,2-Dichloroethane (Ethylene dichloride) - average	W_EDC_In (µg/L)	2238 (903/0)	Average for all samples in county, log transformed	Yes	
1,1,1-Trichloroethane - average	W_111trichlorane_In (µg/L)	2238 (903/0)	Average for all samples in county, log transformed	Yes	
Carbon tetrachloride - average	W_CCl4_In (µg/L)	2237 (904/0)	Average for all samples in county, log transformed	Yes	
1,2-Dichloropropane - average	W_PDC_In (µg/L)	2239 (902/0)	Average for all samples in county, log transformed	Yes	
Trichloroethylene - average	W_Trichlorene_In (µg/L)	2250 (891/0)	Average for all samples in county, log transformed	Yes	
1,1,2-Trichloroethane - average	W_112TCA_In (µg/L)	2235 (906/0)	Average for all samples in county, log transformed	Yes	
Tetrachloroethylene - average	W_C2Cl4_In (µg/L)	2249 (892/0)	Average for all samples in county, log transformed	Yes	
Monochlorobenzene (Chlorobenzene) - average	W_benzene_In (µg/L)	2239 (902/0)	Average for all samples in county, log transformed	Yes	
Benzene - average	W_CH1benz_In (µg/L)	2231 (910/0)	Average for all samples in county, log transformed	Yes	
Toluene - average	W_Toluene_In (µg/L)	2245 (896/0)	Average for all samples in county, log transformed	Yes	
Ethylbenzene - average	W_ethylbenz_In (µg/L)	2241 (900/0)	Average for all samples in county, log transformed	Yes	
Styrene - average	W_styrene_In (µg/L)	2235 (906/0)	Average for all samples in county, log transformed	Yes	
cis-1,2-Dichloroethylene - average	W_DCE_In (µg/L)	2238 (903/0)	Average for all samples in county, log transformed	Yes	
Alpha particles (gross alpha, excluding radon and uranium) - average	W_alpha (pCi/L)	1243 (1898/0)	Average for all samples in county		
Arsenic - detects	W_As_detect (mg/L)	2017	Average for all detects in county	No	Noninformative
Barium - detects	W_Ba_detect (mg/L)	1990	Average for all detects in county	No	Noninformative
Cadmium - detects	W_Cd_detect (mg/L)	1991	Average for all detects in county	No	Noninformative
Chromium (total) - detects	W_Cr_detect (mg/L)	1989	Average for all detects in county	No	Noninformative
Cyanide - detects	W_CN_detect (mg/L)	1385	Average for all detects in county	No	Noninformative
Fluoride - detects	W_FL_detect (mg/L)	2138	Average for all detects in county	No	Noninformative
Mercury (inorganic) - detect	W_HG_detect (mg/L)	2056	Average for all detects in county	No	Noninformative
Nitrate (as N) - detect	W_NO3_detect (mg/L)	1988	Average for all detects in county	No	Noninformative
Nitrite (as N) - detect	W_NO2_detect (mg/L)	1583	Average for all detects in county	No	Noninformative
Selenium - detect	W_SE_detect (mg/L)	1986	Average for all detects in county	No	Noninformative
Antimony - detect	W_Sb_detect (mg/L)	1994	Average for all detects in county	No	Noninformative
Beryllium - detect	W_Be_detect (mg/L)	1932	Average for all detects in county	No	Noninformative
Thallium - detect	W_Tl_detect (mg/L)	1996	Average for all detects in county	No	Noninformative
Asbestos - average	W_asbestos (mg/L)	457	Average for all samples in county, log transformed	No	Zeros
Asbestos - detect	W_asbestos_detect (mg/L)	457	Average for all detects in county	No	Noninformative
Endrin - detect	W_Endrin_detect (µg/L)	1509	Average for all detects in county	No	Noninformative
Lindane - detect	W_Lindane_detects (mg/L)	1990	Average for all detects in county	No	Noninformative
Methoxychlor - detect	W_methoxychlor_detect (µg/L)	1512	Average for all detects in county	No	Noninformative
Toxaphene - detect	W_Toxaphene_detect (µg/L)	1273	Average for all detects in county	No	Noninformative
Dalapon - detect	W_Dalapon_detect (µg/L)	1292	Average for all detects in county	No	Noninformative
Diquat - average	W_Diquat (µg/L)	722	Average for all samples in county	No	Noninformative

Notes: Will use 6-Year Review 2 (data collected between 1998 and 2005). Calculate the following variables for each chemical for each county (aggregating all public water supply in county) for all years combined, missing for those counties without any data; did not keep detects.

**Variables of Interest (Water Domain)**
**National Contaminant Occurrence Database**

Variable	Variable Name	Counties (Missing/Zeros)	Variable Notes	EQI?	Notes
Diquat - detect	W_Diquat_detect (µg/L)	722	Average for all detects in county	No	Noninformative
Endothall - average	W_Endothall (µg/L)	702	Average for all samples in county	No	Zeros
Endothall - detect	W_Endothall_detect (µg/L)	702	Average for all detects in county	No	Noninformative
Glyphosate - average	W_Glyphosate (µg/L)	772	Average for all samples in county	No	Zeros
Glyphosate - detect	W_Glyphosate_detect (µg/L)	772	Average for all detects in county	No	Noninformative
di(2-Ethylhexyl) adipate (DEHA) - detect	W_DEHA_detect (µg/L)	1456	Average for all detects in county	No	Noninformative
Oxamyl (Vydate) - detect	W_Oxamyl_detect (µg/L)	1254	Average for all detects in county	No	Noninformative
Simazine - detect	W_Simazine_detect (µg/L)	1669	Average for all detects in county	No	Noninformative
di(2-Ethylhexyl) phthalate (DEHP) - detect	W_DEHP_detect (µg/L)	1449	Average for all detects in county	No	Noninformative
Picloram - detect	W_Picloram_detect (µg/L)	1352	Average for all detects in county	No	Noninformative
Dinoseb - detect	W_Dinoseb_detect (µg/L)	1347	Average for all detects in county	No	Noninformative
Hexachlorocyclopenta-diene - detect	W_HCCPD_detect (µg/L)	1518	Average for all detects in county	No	Noninformative
Carbofuran - detect	W_Carbofuran_detect (µg/L)	1262	Average for all detects in county	No	Noninformative
Atrazine - detect	W_atrazine_detect (µg/L)	1726	Average for all detects in county	No	Noninformative
Alachlor - detect	W_Alachlor_detect (µg/L)	1662	Average for all detects in county	No	Noninformative
2,3,7,8-TCDD (Dioxin) – average	W_dioxin (µg/L)	123	Average for all samples in county	No	Zeros
2,3,7,8-TCDD (Dioxin) – detects	W_dioxin_detect (µg/L)	123	Average for all detects in county	No	Noninformative
Heptachlor - detects	W_Heptachlor_detect (µg/L)	1509	Average for all detects in county	No	Noninformative
Heptachlor epoxide - detects	W_Heptachlor_epox_detect (µg/L)	1508	Average for all detects in county	No	Noninformative
2,4-D (2,4-Dichlorophenoxyacetic acid) - detect	W_24D_detect (µg/L)	1360	Average for all detects in county	No	Noninformative
2,4,5-TP (Silvex) - detect	W_silvex_detect (µg/L)	1348	Average for all detects in county	No	Noninformative
Hexachlorobenzene - detect	W_HCB_detect (µg/L)	1520	Average for all detects in county	No	Noninformative
Benzo[a]pyrene - detect	W_BenzoAP_detect (µg/L)	1430	Average for all detects in county	No	Noninformative
Pentachlorophenol - detect	W_PCP_detect (µg/L)	1547	Average for all detects in county	No	Noninformative
1,2,4-Trichlorobenzene - detect	W_124TCIB_detect (µg/L)	2239	Average for all detects in county	No	Noninformative
Polychlorinated biphenyls (PCBs) - detect	W_PCBs_detect (µg/L)	848	Average for all detects in county	No	Noninformative
1,2-Dibromo-3-chloropropane (DBCP) - detect	W_DBCP_detect (µg/L)	1652	Average for all detects in county	No	Noninformative
Ethylene dibromide (EDB) - detect	W_EBD_detect (µg/L)	1630	Average for all detects in county	No	Noninformative
Dichloromethane (Methylene chloride) - detect	W_DCM_detect (µg/L)	2245	Average for all detects in county	No	Noninformative
1,2-Dichlorobenzene (o-Dichlorobenzene) - detect	W_ODCB_detect (µg/L)	2236	Average for all detects in county	No	Noninformative
1,4-Dichlorobenzene (p-Dichlorobenzene) - detect	W_PDCB_detect (µg/L)	2165	Average for all detects in county	No	Noninformative
Vinyl chloride - detect	W_VCM_detect (µg/L)	2235	Average for all detects in county	No	Noninformative
1,1-Dichloroethylene - detect	W_11DCE_detect (µg/L)	2238	Average for all detects in county	No	Noninformative
trans-1,2-Dichloroethylene - detect	W_t12DCE_detect (µg/L)	2231	Average for all detects in county	No	Noninformative
1,2-Dichloroethane (Ethylene dichloride) - detect	W_EDC_detect (µg/L)	2238	Average for all detects in county	No	Noninformative
1,1,1-Trichloroethane - detect	W_111trichlorane_detect (µg/L)	2238	Average for all detects in county	No	Noninformative
Carbon tetrachloride - detect	W_CC4_detect (µg/L)	2237	Average for all detects in county	No	Noninformative
1,2-Dichloropropane - detect	W_PDC_detects (µg/L)	2239	Average for all detects in county	No	Noninformative
Trichloroethylene - detect	W_Trichlorene_detect (µg/L)	2250	Average for all detects in county	No	Noninformative
1,1,2-Trichloroethane - detect	W_112TCA_detect (µg/L)	2235	Average for all detects in county	No	Noninformative

Notes: Will use 6-Year Review 2 (data collected between 1998 and 2005). Calculate the following variables for each chemical for each county (aggregating all public water supply in county) for all years combined, missing for those counties without any data; did not keep detects.



### Variables of Interest (Water Domain)

#### National Contaminant Occurrence Database

Variable	Variable Name	Counties (Missing/Zeros)	Variable Notes	EQI?	Notes
Tetrachloroethylene - detect	W_C2Cl4_detect (µg/L)	2249	Average for all detects in county	No	Noninformative
Monochlorobenzene (Chlorobenzene) - detect	W_Cl1benz_detect (µg/L)	2231	Average for all detects in county	No	Noninformative
Benzene - detect	W_benzene_detect (µg/L)	2239	Average for all detects in county	No	Noninformative
Toluene - detect	W_Toluene_detect (µg/L)	2245	Average for all detects in county	No	Noninformative
Ethylbenzene - detect	W_ethylbenz_detect (µg/L)	2241	Average for all detects in county	No	Noninformative
Styrene - detect	W_styrene_detect (µg/L)	2235	Average for all detects in county	No	Noninformative
Alpha particles (gross alpha, excluding radon and uranium) - detect	W_alpha_detect (pCi/L)	1251	Average for all detects in county	No	Noninformative
Combined radium-226/228 - average	W_Ra (pCi/L)	558	Average for all samples in county	No	Zeros
Combined radium-226/228 - detect	W_Ra_detect (pCi/L)	558	Average for all detects in county	No	Noninformative
Beta particles (gross beta) - average	W_beta (pCi/L)	845	Average for all samples in county	No	Noninformative
Beta particles (gross beta) - detect	W_beta_detect (pCi/L)	845	Average for all detects in county	No	Noninformative
Uranium - average	W_U (µg/L)	265	Average for all samples in county	No	Zeros
Uranium - detect	W_U_detect (µg/L)	265	Average for all detects in county	No	Noninformative
cis-1,2-Dichloroethylene - average	W_DCE_detect (µg/L)	2238	Average for all detects in county	No	Noninformative

Notes: Will use 6-Year Review 2 (data collected between 1998 and 2005). Calculate the following variables for each chemical for each county (aggregating all public water supply in county) for all years combined, missing for those counties without any data; did not keep detects.

### Variables of Interest (Water Domain)

#### National Water Information System

#### EPA Storet Database—Not currently using

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Maximum ammonia	In_NWIS_NH4 (mg/L)	1843	Log-transformed	Sensitivity Analysis	
Maximum arsenic	In_NWIS_Arsenic (µg/L)	1401	Log-transformed	Sensitivity Analysis	
Maximum nitrate	In_NWIS_Nitrate (mg/L)	1630	Log-transformed	Sensitivity Analysis	
Maximum nitrate-nitrite	In_NWIS_N_N (mg/L)	1909	Log-transformed	Sensitivity Analysis	
Maximum nitrite	In_NWIS_Nitrite (mg/L)	1618	Log-transformed	Sensitivity Analysis	
Maximum nitrogen (mixed forms)	In_NWIS_Mixed_N (mg/L)	1716	Log-transformed	Sensitivity Analysis	
Maximum organic nitrogen	In_NWIS_Organic_N (mg/L)	1622	Log-transformed	Sensitivity Analysis	
Maximum phosphate	In_NWIS_Phosphate (mg/L)	1681	Log-transformed	Sensitivity Analysis	
Maximum phosphorus	In_NWIS_Phosphorus (mg/L)	1634	Log-transformed	Sensitivity Analysis	
Average Turbidity	In Access Database	1348	Measured in different units and not comparable	No	Not Comparable
Turbidity category	In Access Database	690		No	Zeros
Maximum discharge	In Access Database	78		No	Zeros
Maximum acifluorfen	In Access Database	728		No	Zeros
Maximum chlorophyll	In Access Database	30		No	Zeros
Maximum chlorophyll a	In Access Database	1183		No	Zeros
Maximum chlorophyll b	In Access Database	224		No	Zeros
Maximum chlorophyll c	In Access Database	9		No	Zeros
Maximum nitrogen	In Access Database	633		No	Zeros
Maximum nitrogen (15/14 ratio)	In Access Database	132		No	Zeros
Maximum phosphate-phosphorus	In Access Database	400		No	Zeros
Maximum phosphoric acid	In Access Database	260		No	Zeros
Sediment	In Access Database	1005		No	Zeros

Notes: Average of all values for a measure in the county. Not enough data for annual measure; therefore, used all years combined, 2000-2005. Use as replacements for sensitivity analysis, but all measures are in other datasets. In sensitivity analysis, all have very low loadings.



## Variables of Interest (Water Domain)

### Safe Drinking Water Information System

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Total arsenic violations	SDWIS_Arsenic	575	Count variable	Sensitivity Analysis	
Total Total Coliform Rule violations	SDWIS_Coliform	2368	Count variable	Sensitivity Analysis	
Total other inorganic chemicals violations	SDWIS_IOC	830	Count variable	Sensitivity Analysis	
Total Lead and Copper Rule violations	SDWIS_LCR	895	Count variable	Sensitivity Analysis	
Total nitrates violations	SDWIS_Nitrates	1309	Count variable	Sensitivity Analysis	
Total radionuclides violations	SDWIS_Radionuclides	259	Count variable	Sensitivity Analysis	
Total synthetic organic chemicals violations	SDWIS_SOC	554	Count variable	Sensitivity Analysis	
Total Surface Water Treatment Rule violations	SDWIS_SWTR	507	Count variable	Sensitivity Analysis	
Total volatile organic chemicals violations	SDWIS_VOC	641	Count variable	Sensitivity Analysis	
Total pathogen violations	SDWIS_Pathogens	4			Zeros
Total Stage 1 Disinfectants By-Product Rule violations	SDWIS_DBP	32			Zeros
Total turbidity violations	SDWIS_Turbidity	25			Zeros

Notes: Cumulative count of violations for all public water suppliers in county for the year. Data are available annually. Data compiled for 2002. Use as replacements for sensitivity analysis, but all measures are in other datasets.

## Variables of Interest (Land Domain)

### 2002 Census of Agriculture

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Commercial fertilizer, lime, and soil conditioners	pct_lime_acres	3065		Yes	
Manure	pct_manure_acres_ln	2975		Yes	
Chemicals used to control insects	pct_insecticide_acres	3141		Yes	
Chemicals used to control weeds, grass, or brush	pct_weed_acres	3061		Yes	
Chemicals used to control nematodes	pct_nematode_acres_ln	1933		Yes	
Chemicals used to control diseases in crops and orchards	pct_disease_acres_ln	2530		Yes	
Chemicals used to control growth, thin fruit, or defoliate	pct_defoliate_acres_ln	1980		Yes	
Barley for grain (bushels)	pct_barley_acres	1252		No	Deleted; too many missing counties
Buckwheat (bushels)	pct_buckwheat_acres	233		No	Deleted; too many missing counties
Corn for grain (bushels)	pct_corn_acres	2588		Yes	
Cotton, all (bales)	pct_cotton_acres	663		No	Deleted; too many missing counties
Dry southern peas (cowpeas) (bushels)	pct_cowpeas_acres	186		No	Deleted; too many missing counties
Durum wheat for grain (bushels)	pct_durum_wheat_acres	154		No	Deleted; too many missing counties
Dry edible beans, excluding limas (cwt)	pct_edible_beans_acres	583		No	Deleted; too many missing counties
Flaxseed (bushels)	pct_flaxseed_acres	117		No	Deleted; too many missing counties
Lentils (cwt)	pct_lentils_acres	48		No	Deleted; too many missing counties
Dry lima beans (cwt)	pct_lima_beans_acres	48		No	Deleted; too many missing counties
Proso millet (bushels)	pct_millet_acres	178		No	Deleted; too many missing counties
Mustard seed (pounds)	pct_mustard_acres	92		No	Deleted; too many missing counties
Oats for grain (bushels)	pct_oats_acres	2221			Deleted; too many missing counties
Other spring wheat for grain (bushels)	pct_oth_wheat_acres	520		No	Deleted; too many missing counties
Peanuts for nuts (pounds)	pct_peanuts_acres	406		No	Deleted; too many missing counties

Notes: Acres of crop or treatment were divided by total county acres to get percentage of item per county. Some counties had suppressed acreage due to identifiability issues. For these, the unaccounted for acreage for each State was calculated (total State acreage—listed county acreage). The acreage was divided equally among the farms in counties with suppressed information. Data for Hawaii and Alaska are not available. These data are refreshed every 5 years. The next available data is for 2007.

### Variables of Interest (Land Domain)

#### 2002 Census of Agriculture

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Dry edible peas (cwt)	pct_peas_acres	222		No	Deleted; too many missing counties
Pima cotton (bales)	Pct_pima_cotton_acres	21		No	Deleted; too many missing counties
Popcorn (pounds, shelled)	Pct_popcorn_acres	426		No	Deleted; too many missing counties
Potatoes (cwt)	Pct_potato_acres	1565		Yes	
Rice (cwt)	Pct_rice_acres	150		No	Deleted; too many missing counties
Rye for grain (bushels)	pct_rye_acres	1211		No	Deleted; too many missing counties
Safflower (pounds)	pct_safflower_acres	113		No	Deleted; too many missing counties
Sorghum for grain (bushels)	pct_sorghum_acres	1318		No	Deleted; too many missing counties
Soybeans for beans (bushels)	pct_soybean_acres	2082		Yes	
Emmer and spelt (bushels)	pct_spelt_acres	181		No	Deleted; too many missing counties
Sugarbeets for sugar (tons)	pct_sugarbeet_acres	158		No	Deleted; too many missing counties
Sunflower seed, all (pounds)	pct_sunflower_acres	779		No	Deleted; too many missing counties
Sweet potatoes (cwt)	pct_sweet_potatoes_acres	600		No	Deleted; too many missing counties
Tobacco (pounds)	pct_tobacco_acres	565		No	Deleted; too many missing counties
Triticale (bushels)	pct_triticale_acres	180		No	Deleted; too many missing counties
Upland cotton (bales)	pct_upland_cotton_acres	663		No	Deleted; too many missing counties
Wheat for grain, all (bushels)	pct_wheat_acres	2520		Yes	
Wild rice (cwt)	pct_wild_rice_acres	20		No	Deleted; too many missing counties
Winter wheat for grain (bushels)	pct_winter_wheat_acres	2472		No	Under wheat
Animal units	pct_au_ln	3078	1 animal unit is equal to 0.94 cattle and calves, 5.88 hogs and pigs, 250 egg-laying chickens, and 455 broiler chickens.	Yes	
Number of farms	farms_per_acre_ln	3039		Yes	
Irrigated acres	pct_irrigated_acres_ln	2815		Yes	
Harvested acres	pct_harvest_acres	2755		Yes	

Notes: Acres of crop or treatment were divided by total county acres to get percentage of item per county. Some counties had suppressed acreage due to identifiability issues. For these, the unaccounted for acreage for each State was calculated (total State acreage—listed county acreage). The acreage was divided equally among the farms in counties with suppressed information. Data for Hawaii and Alaska are not available. These data are refreshed every 5 years. The next available data is for 2007.

### Variables of Interest (Land Domain)

#### National Pesticide Use Dataset and 2002 Census of Agriculture

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Insecticides	insecticides_ln	2761		Yes	
Herbicides	herbicides_ln	2907		Yes	
Fungicides	fungicides_ln	2256		Yes	
Other pesticides	oth_pesticides	820		No	Deleted; too many missing counties

Notes: Pesticide concentrations were estimated by multiplying the State rate of use by crop by the acres for each crop. Pesticides then were grouped by class and added together to get class level estimates of pesticide application. These data are refreshed every 5 years. The next

### Variables of Interest (Land Domain)

#### National Geochemical Survey

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Mean level of arsenic from sampled county sources	Mean_as_In	3083	See notes above	Yes	
Mean level of selenium from sampled county sources	Mean_se_In	3082	See notes above	Yes	
Mean level of mercury from sampled county sources	Mean_hg_In	3082	See notes above	Yes	
Mean level of lead from sampled county sources	Mean_pb_In	3083	See notes above	Yes	
Mean level of zinc from sampled county sources	Mean_zn_In	3083	See notes above	Yes	
Mean level of copper from sampled county sources	Mean_cu_In	3083	See notes above	Yes	
Mean level of aluminum from sampled county sources	Mean_al_pct	3083	See notes above	Yes	
Mean level of sodium from sampled county sources	Mean_na_pct	3083	See notes above	Yes	
Mean level of magnesium from sampled county sources	Mean_mg_pct_In	3083	See notes above	Yes	
Mean level of titanium from sampled county sources	Mean_ti_pct_In	3083	See notes above	Yes	
Mean level of calcium from sampled county sources	Mean_ca_pct_In	3083	See notes above	Yes	
Mean level of manganese from sampled county sources	Mean_mn	3083	See notes above	Yes	
Mean level of iron from sampled county sources	Mean_fe_pct_In	3083	See notes above	Yes	
Mean level of phosphorus from sampled county sources	mean_al_pct	3083	See notes above	Yes	

Notes: The U.S. National Geochemical Survey (NGS) geochemistry by county database (for the United States) was published on September 30, 2008, but the actual data were collected over many years across the 50 States (ranging from 1998-2007) (<http://tin.er.usgs.gov/geochem/doc/averages/countydata.htm>). To create the county database, "All data in the NGS database were pooled for the purpose of display in the gridded maps. Data for stream sediments, soils, and other media were combined" (from <http://tin.er.usgs.gov/geochem/doc/mapdoc.htm>). "The current (2008) NGS database (<http://tin.er.usgs.gov/geochem/doc/home.htm>) contains analyses of 74,498 samples and 2714 standards" (from <http://tin.er.usgs.gov/geochem/doc/status.htm>). According to NGS, "The samples and data that comprise the NGS database come from a wide variety of sources." See <http://tin.er.usgs.gov/geochem/doc/groups-cats.htm> for a description of the sources, along with their associated date ranges. Refresh dates are not available.

### Variables of Interest (Land Domain)

#### U.S. Environmental Protection Agency (EPA) Radon Zones Map

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Radon zones	Radon_zone	3126	Three-level variable	Yes	

Notes: The EPA Map of Radon Zones identifies areas of the United States with the potential for elevated indoor radon levels. Each U.S. county (3141) is assigned to one of three zones based on radon potential. Data years are unavailable. Presumably, radon is a stable feature, and the map is not variable, but refresh dates are not available. No other information is available in data documentation.

### Variables of Interest (Land Domain)

#### Superfund National Priorities List Sites

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Count of superfund NPL sites per county	sf_county_count	721		Yes	Included as part of composite count variable

Notes: Superfund National Priorities List (NPL) site locations are available through the EPA Geospatial Data Access Project. Sites were included in the counts if they were identified in 2000 through 2005. Published July 2, 2009. Start and end dates are not available. Data are refreshed monthly.

### Variables of Interest (Land Domain)

#### Resource Conservation and Recovery Act Treatment, Storage, and Disposal Facilities and RCRA Corrective Action Facilities

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Count of RCRA TSD and corrective action facilities per county	rcra_tsd_count_by_fips	874		Yes	Included as part of composite count variable

Notes: Resource Conservation and Recovery Act (RCRA) treatment, storage, and disposal (TSD) and corrective action facilities site locations available through the EPA Geospatial Data Access Project. Sites were included in the counts if they were identified in 2000 through 2005. Published July 2, 2009. Start and end dates not available. Data refreshed monthly.

### Variables of Interest (Land Domain)

#### Resource Conservation and Recovery Act Large-Quantity Generators

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Count of RCRA LQG facilities per county	rcralqg_count	1926		Yes	Included as part of composite count variable

Notes: Resource Conservation and Recovery Act (RCRA) large-quantity generator (LQG) site locations through the EPA Geospatial Data Access Project. Sites were included in the counts if they were identified in 2000 through 2005. Published July 2, 2009. Start and end dates not available. Data refreshed monthly.

**Variables of Interest (Land Domain)****Toxic Release Inventory Sites**

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Count of TRI sites per county	tri_county_count	2670		Yes	Included as part of composite count variable

Notes: Toxic Release Inventory (TRI) sites available through the EPA Geospatial Data Access Project. Sites were included in the counts if they were identified in 2000 through 2005. Published July 2, 2009. Start and end dates not available. Data refreshed monthly.

**Variables of Interest (Land Domain)****Assessment, Cleanup and Redevelopment Exchange (ACRES) Brownfield Sites**

Variables	Variable Name	Counties	Variable Notes	EQI?	Notes
Count of ACRES sites per county	acres_county_count	1226		Yes	Included as part of composite count variable

Notes: Brownfield site locations available through the EPA Geospatial Data Access Project. Sites were included in the counts if they were identified in 2000 through 2005. Published July 2, 2009. Start and end dates not available. Data refreshed monthly.

**Variables of Interest (Land Domain)****Section Seven Tracking System Pesticide-Producing-Site Locations**

Variable	Variable Name	Counties	Variable Notes	EQI?	Notes
Count of SSTS sites per county	ssts_county_count	2095		Yes	Included as part of composite count variable

Notes: Section Seven Tracking System (SSTS) pesticide-producing-site locations available through the EPA Geospatial Data Access Project. Sites were included in the counts if they were identified in 2000 through 2005. Published July 2, 2009. Start and end dates not available. Data refreshed but not annually.

**Variables of Interest (Sociodemographic Domain)****U.S. Census Summary Files**

Variable	Variable Name	Counties	Variable Notes	EQI?	No, Notes
Percent renter-occupied units	pct_rent_occ	3141		Yes	
Percent vacant units	pct_vac_units	3141		Yes	
Median household value	med_hh_value	3141		Yes	
Median household income	med_hh_inc	3141		Yes	
Percent of persons less than poverty level	pct_pers_lt_pov	3141		Yes	
Percent of persons who do not speak English	pct_no_eng	3141		Yes	
Percent of persons with more than high school education	pct_hs_more	3141		Yes	
Percent of persons who work outside their county of residence	work_out_co	3141		Yes	
Median number of rooms in residence	med_rooms	3141		Yes	
Percent of residences with more than 10 units	pct_mt_10units_log	3141		Yes	

Notes: Many, many more variables are available from the U.S. Census than will be described here. The variables identified here are those that will be used in the EQI and not the plethora of variables that could be constructed. Data are available for multiple units of geographic aggregation, including the county-level. Full population data are collected decennially; sample data are collected more frequently. The percent of residences with more than 10 units variable was log-transformed to enable it to approximate normality. Data are available for download from the U.S. Census Bureau Web site.



### Variables of Interest (Sociodemographic Domain)

#### Federal Bureau of Investigation Uniform Crime Reports

Variable	Variable Name	Counties	Variable Notes	EQI?	No, Notes
Violent crime rate	violent_rate_log	1055	Variable kriged to estimate values for counties with no reported violent crime data.	Yes	
Murder-manslaughter crime rate	murder_manslaughter_rate	1062	Variable kriged to estimate values for counties with no reported violent crime data.	No	Constituent of violent crime rate
Rape crime rate	rape_rate	1055	Variable kriged to estimate values for counties with no reported violent crime data.	No	Constituent of violent crime rate
Robbery crime rate	rob_rate	1062	Variable kriged to estimate values for counties with no reported violent crime data.	No	Constituent of violent crime rate
Aggravated assault crime rate	agg_assault_rate	1062	Variable kriged to estimate values for counties with no reported violent crime data.	No	Constituent of violent crime rate
Property crime rate	prop_rate	1062	Variable kriged to estimate values for counties with no reported property crime data.	No	Highly correlated with violent crime; violent crime shown more consistent association in literature.
Burglary crime rate	burg_rate	1062	Variable kriged to estimate values for counties with no reported property crime data.	No	Constituent of property crime rate
Larceny crime rate	larc_rate	1062	Variable kriged to estimate values for counties with no reported property crime data.	No	Constituent of property crime rate
Vehicle theft rate	vehicle_theft_rate	1062	Variable kriged to estimate values for counties with no reported property crime data.	No	Constituent of property crime rate

Notes: Federal Bureau of Investigation (FBI) Uniform Crime Reports data were downloaded for each county in each State from the Web site (<http://www.ucrdatatool.gov/>). Data are available by year and by crime type (violent = murder and nonnegligent manslaughter, forcible rape, robbery, and aggravated assault; property = burglary, larceny/theft, and motor vehicle theft). Data from 2000-2005 were kriged temporally and spatially for use in the EQI. Data reporting is voluntary. Data are available at the city and county levels, but many counties do not report these data. Data are for law enforcement agencies serving city jurisdictions with populations of 10,000 or more and county agencies of 25,000 or more. Therefore, data may not be available for each jurisdiction each year. Data are available from 1960 to current year. Rates were obtained from the FBI. The violent crime rate data were transformed (log) to account for the large number of zeros and to result in nearly normally distributed data.

### Variables of Interest (Sociodemographic Domain)

#### Home Mortgage Disclosure Act Data – Not used.

Notes: These data are available by year and by State from this Web site (<http://www.ffiec.gov/hmdaadwebreport/AggWelcome.aspx>). Unfortunately, only a few counties per state report these data. While this data source would be a good data source for larger Metropolitan Statistical Areas or municipalities, it was not appropriate for a county-level analysis.

### Variables of Interest (Built Domain)

#### Housing and Urban Development (HUD) Data

Variable	Variable Name	Counties	Variable Notes	EQI?	Notes
Rate of low-rent HUD units in county	log_low_rent_rate	2080	Variable transformed (log) to enable it to approximate normal distribution.	No	Constituent of total unit rate
Rate of Section 8 units in county	log_sec_8_rate	2080	Variable transformed (log) to enable it to approximate normal distribution.	No	Constituent of total unit rate
Rate of low-rent plus Section 8 units in county	to_unit_rate_log	3141	Variable transformed (log) to enable it to approximate normal distribution.	Yes	Zeros considered meaningful zeros (lack of public housing)

Notes: These data provide a count of the low-rent and Section 8 housing in each housing authority area. These housing authority areas correspond to cities, which then are assigned FIPS codes. Counties without housing authority cities are given a count of zero for low-rent and/or Section 8 housing. These data were transformed (log) to account for the large number of zeros and to result in nearly normally distributed data. Data are refreshed frequently (e.g., updates on Alaska data were April 2012 and August 2012), but update frequency was not provided. Historic data do not appear to be available from Web site. Data were collected in 2010, but, because low-rent and Section 8 housing do not change substantially over time, these data are considered representative of the 2000-2005 period. Rates for each variable constructed by dividing count by county population

### Variables of Interest (Built Domain)

#### Fatality Analysis Reporting System Data

Variable	Variable Name	Counties	Variable Notes	EQI?	Notes
Rate of fatal car crashes per county	fatal_rate_log	3141	Variable transformed (log) to enable it to approximate normal distribution.	No	

Notes: The Fatality Analysis Reporting System (FARS) is a nationwide census providing the National Highway Traffic Safety Administration yearly data regarding fatal injuries suffered in motor vehicle traffic crashes. FARS data are available from 1975 (<http://www.nhtsa.gov/FARS/>). Rates for the count of fatal crashes per county for 2000-2005 were constructed by dividing count by county population. These data were transformed (log) to account for the large number of zeros and to result in nearly normally distributed data. These data can be updated annually.

### Variables of Interest (Built Domain)

#### 2000 U.S. Census Summary Files

Variable	Variable Name	Counties	Variable Notes	EQI?	Notes
Percent of county residents who report using public transportation	pct_public_transport_log	3141	Variable transformed (log) to enable it to approximate normal distribution.	Yes	

Notes: Many, many more variables are available from the U.S. Census than will be described here. The variables identified here are those that will be used in the EQI and not the plethora of variables that could be constructed. Data are available for multiple units of geographic aggregation, including the county-level. Full population data are collected decennially; sample data are collected more frequently. These data were transformed (log) to account for the large number of zeros and to result in nearly normally distributed data. Data are available for download from the U.S. Census Bureau Web site.

### Variables of Interest (Built Domain)

#### TIGER Files

Variable	Variable Name	Counties	Variable Notes	EQI?	Notes
Proportion of all roads that are highways	hwypop	3141		Yes	
Proportion of all roads that are secondary roads	ryrpo	3141		Yes	
Proportion of all roads that are streets	strpop	3141		No	Remaining roads are streets; therefore, having two of three types sufficient.

Notes: Topologically Integrated Geographic Encoding and Referencing (TIGER) products provide maps and road layers worldwide and for the United States. These data are updated regularly but do not change substantially over time. The data used in the EQI are from 2003. Data are available at Census geography. For the street types, the highway, and secondary and local roads (tertiary roads) per county per state were downloaded. Proportion of each road type was constructed by dividing the distance of each road type by the total amount of each road.

### Variables of Interest (Built Domain)

#### Dun and Bradstreet

Variable	Variable Name	Counties	Variable Notes	EQI?	Notes
Rate of positive food environment businesses per county	rate_food_env_pos_log	3134		Yes	
Rate of negative food environment businesses per county	rate_food_env_neg	2770		Yes	
Rate of alcohol, pawn, gaming businesses per county	rate_al_pn_bm_env_log	2942		Yes	
Rate of entertainment businesses per county	rate_ent_env_log	2877		Yes	
Rate of health-care-related businesses per county	rate_hc_env_log	3108		Yes	
Rate of recreation-related businesses per county	rate_rec_env_log	2951		Yes	
Rate of education-related businesses per county	rate_ed_env_log	1283		Yes	
Rate of social-service-related businesses per county	rate_ss_env_log	3097		Yes	
Rate of transportation-related businesses per county	rate_trans_env_log	2628		Yes	

Notes: Dun and Bradstreet collect commercial information on businesses. Its database contains more than 195 million records and is proprietary. The data are put through an extensive quality assurance process, which includes over 2000 separate automated checks, plus several manual checks. Data are updated daily. Rates of each type of business in 2002 were calculated by dividing the counts of each variable by the county population. These data were transformed (log) to account for the large number of zeros and to result in nearly normally distributed data.

### Variables of Interest (Built Domain)

#### Rural-Urban Commuting Area—Not used

Notes: These data are available from the U.S. Census and are constructed at the census-tract level. Because they were constructed for a smaller unit of aggregation (tract) and would have to be aggregated to a larger unit of geography (county), they were not used in the EQI. Full population data are collected decennially; sample data are collected more frequently. Data are available for download from the U.S. Census Bureau Web site.

### Variables of Interest (Built Domain)

#### Urban-Influence Code—Not used

Notes: The 2003 urban influence codes form a classification scheme that distinguishes metropolitan counties by size and nonmetropolitan counties by size of the largest city or town and proximity to metropolitan and micropolitan areas. The standard Office of Management and Budget (OMB) metropolitan and nonmetropolitan categories have been subdivided into two metropolitan and 10 nonmetropolitan categories, resulting in a 12-part county codification. This scheme was originally developed in 1993. This scheme enables researchers to break county data into finer residential groups, beyond metropolitan and nonmetropolitan, particularly for the analysis of trends in nonmetropolitan areas that are related to population density and metropolitan influence. . This data source was not used because it is very similar to the rural-urban continuum codes, which have been used more widely in the literature.

# Appendix III

## Table of Highly Correlated Variables for Each Domain

Air Domain			
Variable	Correlated Variables	Used in EQI?	If Not, Variable Used To Represent Group
Trichlorobenzene124	Methanol (.85), Phenol (.98)	No	Methanol
Butadinene13	Trimethylpentane224 (.83) Acetaldehyde (.89)	No	Toluene
	Ethylbenzene (.81) Formaldehyde (.93) Propionaldehyde (.75) Toluene (.9)		
	Xylenes (.81)		
Dichloropropene13	Benzene (.88)	No	Chlorobenzene
Dichlorobenzene14	Chlorobenzene (.82) Methyl_bromide (.87)	No	Tetrachloroethylene
Trimethylpentane224	Tetrachloroethylene (.76)	No	Toulene
	Butadiene13 (.83)		
	Dinitrotoluene24 (.72)		
	Acetaldehyde (.82)		
	Ethylbenzene (.94)		
	Formaldehyde (.74)		
	Naphthalene (.70)		
	Propionaldehyde (.78)		
	Toluene (.93)		
	Xylenes (.91)		
Dinitrotoluene24	Benzene (.85)	No	Toluene
	Trimethylpentane224 (.72)		
	Chloroform (.72)		
	Ethylbenzene (.76)		
	Naphthalene (.70)		
Nitropropane2	Xylenes (.74)	Yes	
	Benzene (.79)		
	MDL_44 (.77)		
Acetaldehyde	Butadiene13 (.89)	No	Toluene
	Trimethylpentane224 (.82)		
	Ethylbenzene (.79)		
	Formaldehyde (.92)		
	Propionaldehyde (.84)		
	Toluene (.90)		
Allyl_chloride	Xylenes (.78)	No	Epichlorohydrin
	Benzene (.86)		
Carbon_tetrachloride	Epichlorohydrin (.93)	Yes	
Chlorobenzene	Methyl_chloride (.7)	Yes	
	Dichloropropene13 (.82) Methyl_bromide (.86)		
Chloroform	Naphthalene (.73)	Yes	
	Dinitrotoluene24 (.72)		
Chromium_compounds	Xylenes (.71)	Yes	
Cobalt_compounds	Cobalt_compounds (.88) Nickel_compounds (.8)	No	Chromium_compounds
Epichlorohydrin	Nickel_compounds (.8) Chromium_compounds (.88)	Yes	
Ethylbenzene	Allyl_chloride (.93)	No	Toluene
	Butadinene13 (.81) Trimethylpentane224 (.94)		
	Dinitrotoluene24 (.76) Acetaldehyde (.79) Formaldehyde (.73) Naphthalene (.74) Propionaldehyde (.77)		
	Tetrachloroethylene (.71)		
	Toluene (.94)		
	Xylenes (.98)		
Formaldehyde	Benzene (.86)	No	Toluene
	Butadinene13 (.93) Trimethylpentane224 (.74)		
	Acetaldehyde (.92) Ethylbenzene (.73) Propionaldehyde (.76)		
	Toluene (.84)		
	Xylenes (.73)		
	Benzene (.83)		

## Air Domain

Variable	Correlated Variables	Used in EQI?	If Not, Variable Used To Represent Group
Hydrochloric_acid	Hydrofluoric_acid (.1) Arsenic_compds (.8)	Yes	
Hydrofluoric_acid	Hydrochloric_acid (.1) Arsenic_compds (.8)	No	Hydrochloric_acid
Methanol	Trichlorobenzene124 (.85) Phenol (.86)	Yes	
Methyl_bromide	Dichloropropene13 (.87) Chlorobenzene (.86) Naphthalene (.72)	No	Chlorobenzene
Methyl_chloride	Carbon_tetrachloride (.7)	No	Carbon_tetrachloride
Naphthalene	Chlorobenzene (.73) Methyl_bromide (.72) Trimethylpentane224 (.7) Dinitrotoluene24 (.7) Ethylbenzene (.74) Tetrachloroethylene (.74) Toluene (.75) Xylenes (.78)	No	Toluene
Nickel_compounds	Cobalt_compounds (.8) Chromium_compounds (.8)	No	Chromium_compounds
Phenol	Trichlorobenzene124 (.98) Methanol (.86)	No	Methanol
Propionaldehyde	Butadinene13 (.75) Trimethylpentane224 (.78) Acetaldehyde (.84) Ethylbenzene (.77) Formaldehyde (.76) Toluene (.81) Xylenes (.76) Benzene (.74)	No	Toluene
Tetrachloroethylene	Dichlorobenzene14 (.76)	Yes	
Toluene	Butadinene13 (.9) Trimethylpentane224 (.94) Dinitrotoluene24 (.74) Acetaldehyde (.90) Ethylbenzene (.94) Formaldehyde (.84) Naphthalene (.75) Propionaldehyde (.81) Tetrachloroethylene (.74) Xylenes (.93) Benzene (.91) Butadinene13 (.81) Trimethylpentane224 (.91) Dinitrotoluene24 (.79) Acetaldehyde (.78) Chloroform (.71)	Yes	
Xylenes	Ethylbenzene (.98) Formaldehyde (.73) Naphthalene (.78) Propionaldehyde (.76) Tetrachloroethylene (.73) Toluene (.93) Benzene (.85)	No	Toluene
MDI_44	Nitropropane2 (.76)	No	Nitropropane 2
Arsenic_compounds	Hydrochloric_acid (.1) Hydrofluoric_acid (.1)	No	Hydrochloric_acid
Benzene	Butadinene13 (.88) Trimethylpentane224 (.85) Acetaldehyde (.86) Ethylbenzene (.85) Formaldehyde (.83) Propionaldehyde (.74) Toluene (.91) Xylenes (.85)	No	Toluene

## Water Domain

Variable	Correlated Variables	Used in EQI?	If Not, Variable Used To Represent Group
NPDES_GENERALFACILITIES	INDNPDESperKM (.75)	No	INDNPDESperKM
NPDES_INDIVIDUAL	INDNPDESperKM (.73)	No	INDNPDESperKM
NPDES_TOTAL	INDNPDESperKM (.80)	No	INDNPDESperKM
INDNPDESperKM	NPDES_GENERALFACILITIES (.75), NPDES_INDIVIDUAL (.73), NPDES_TOTAL (.80)	Yes	
Per_TotPopPS_2000	Percent SS (.80)	No	Per_PSWithSW_ave
Per_PSWithGW_2000	Percent PS with SW Supply (1.0)	No	Per_PSWithSW_ave
Per_DOPS_2000	Percent PS with SW Supply (.73)	No	Per_PSWithSW_ave
Per_DOSS_2000	Percent SS (.92)	No	Per_TotPopSS_ave
AvgOfNothing_ave	AvgOfD0 AvgOfD0 (1.00), AvgOfD1 AvgOfD1 (.94), AvgOfD2 AvgOfD2 (.86), AvgOfD3 AvgOfD3 (.71)	No	AvgOfD3_ave
AvgOfD0_ave	AvgOfNothing (.94), AvgOfD1 AvgOfD1 (.94), AvgOfD2 AvgOfD2 (.86), AvgOfD3 AvgOfD3 (.71)	No	AvgOfD3_ave
AvgOfD1_ave	AvgOfNothing (.94), AvgOfD0 AvgOfD0 (.94), AvgOfD2 AvgOfD2 (.86), AvgOfD3 AvgOfD3 (.71)	No	AvgOfD3_ave
AvgOfD2_ave	AvgOfNothing (.86), AvgOfD0 AvgOfD0 (.86), AvgOfD1 AvgOfD1 (.94), AvgOfD3 AvgOfD3 (.71)	No	AvgOfD3_ave

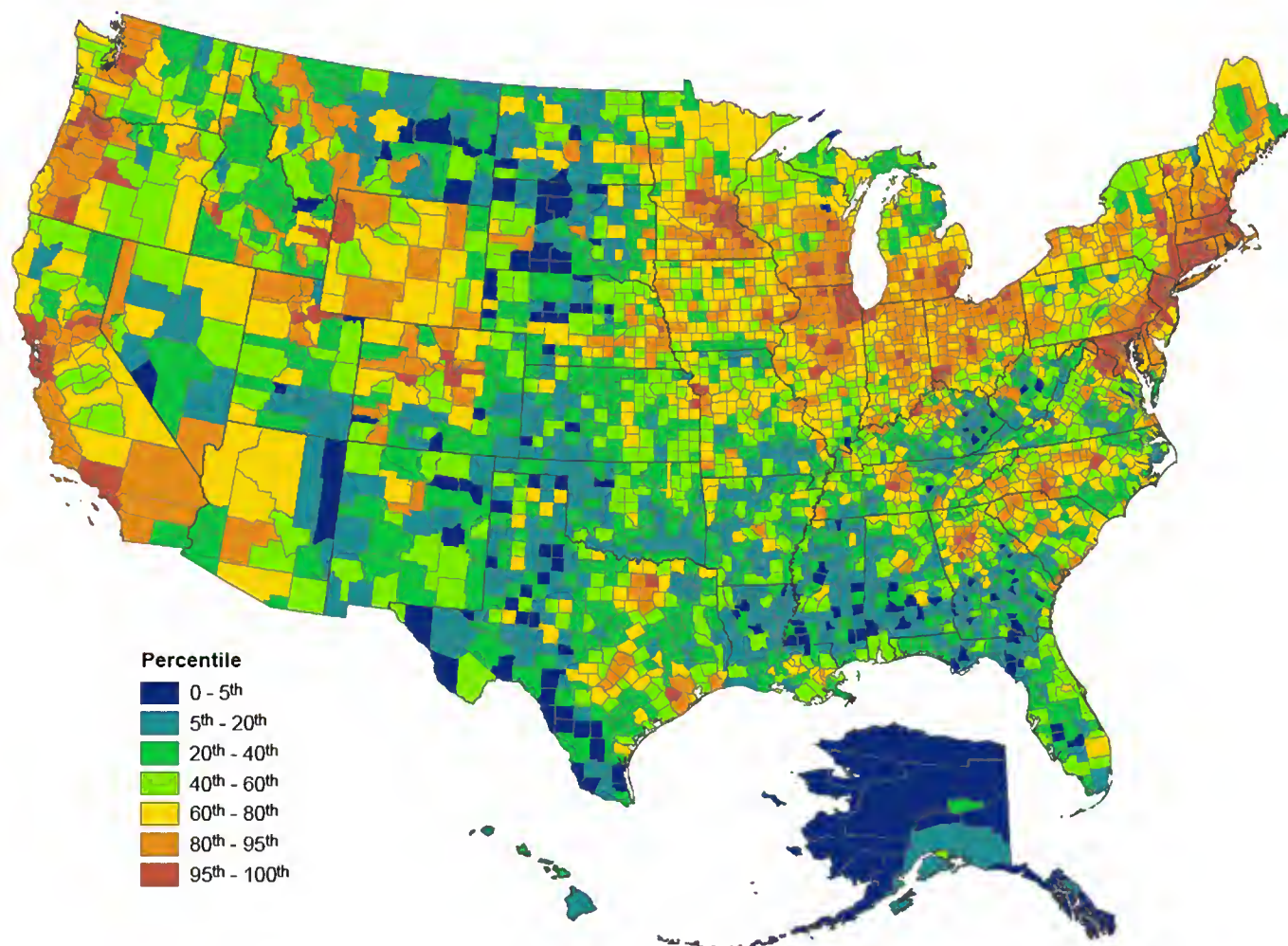


Water Domain			
Variable	Correlated Variables	Used in EQI?	If Not, Variable Used To Represent Group
AvgOfD4_ave	AvgOfD1 AvgOfD1 (.94), AvgOfD2 AvgOfD2 (.86), AvgOfD3 AvgOfD3 (.80)	No	AvgOfD3_ave
Land Domain			
Variable	Correlated Variables	Used in EQI?	If Not, Variable Used To Represent Group
Mean iron percent	Mean manganese (0.90)	Yes	
Mean manganese	Mean iron percent (0.90)	No	Mean iron percent
Percent weed acres	Percent harvested acres (0.96), percent lime acres (0.95)	No	Percent harvested acres
Percent lime acres	Percent harvested acres (0.97), percent weed acres (0.95)	No	Percent harvested acres
Percent harvested acres	Percent weed acres (0.96), percent lime acres (0.97)	Yes	
Sociodemographic Domain			
Variable	Correlated Variables	Used in EQI?	If Not, Variable Used To Represent Group
Property crime rate	Violent crime rate (0.91)	No	Violent crime rate
Violent crime rate	Property crime rate (0.91)	Yes	
Built Domain			
Variable	Correlated Variables	Used in EQI?	If Not, Variable Used To Represent Group
Secondary road proportion	Street proportion (-0.94)	No	Street proportion
Street proportion	Secondary road proportion (-0.94)	Yes	



## Appendix IV

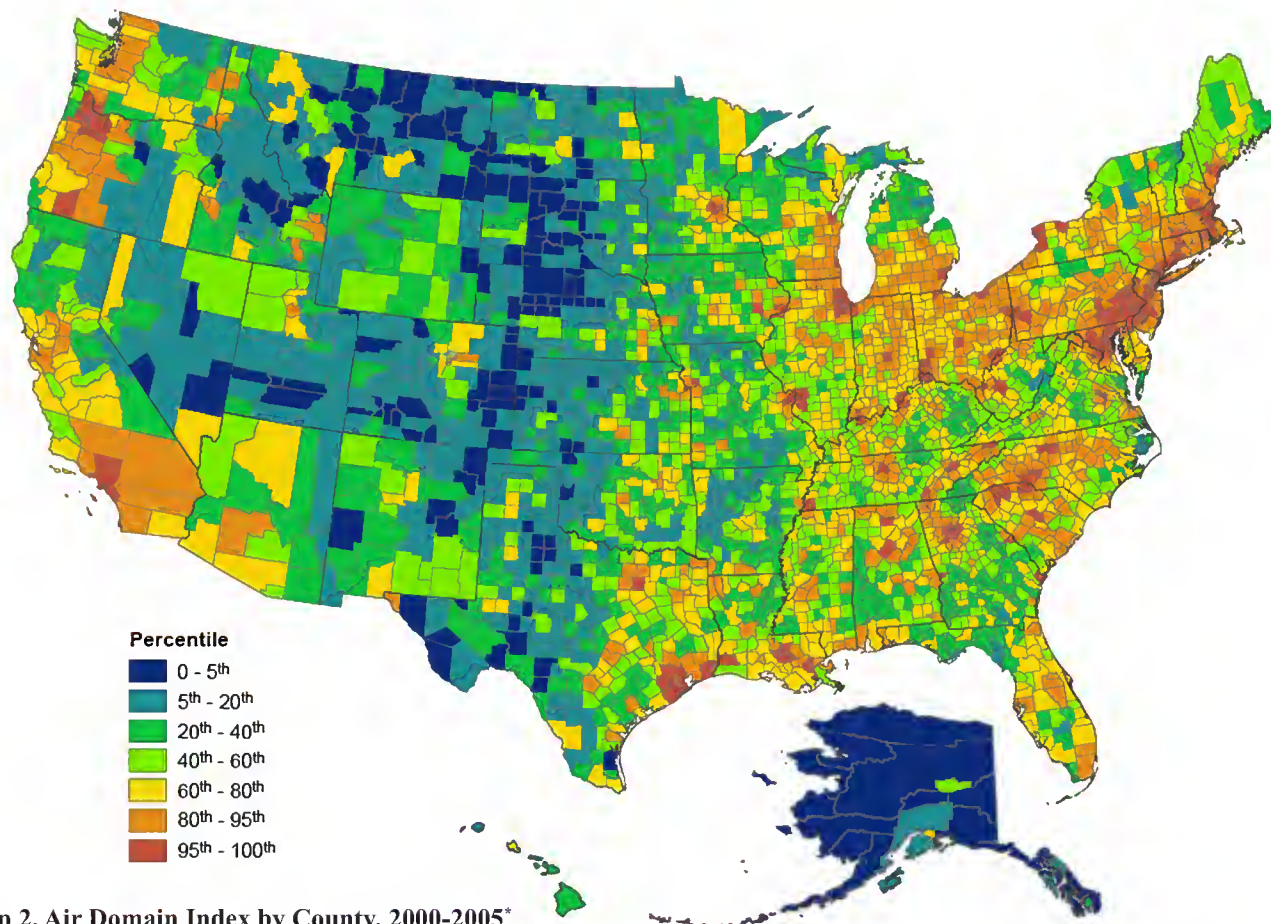
### County Maps of Environmental Quality Index



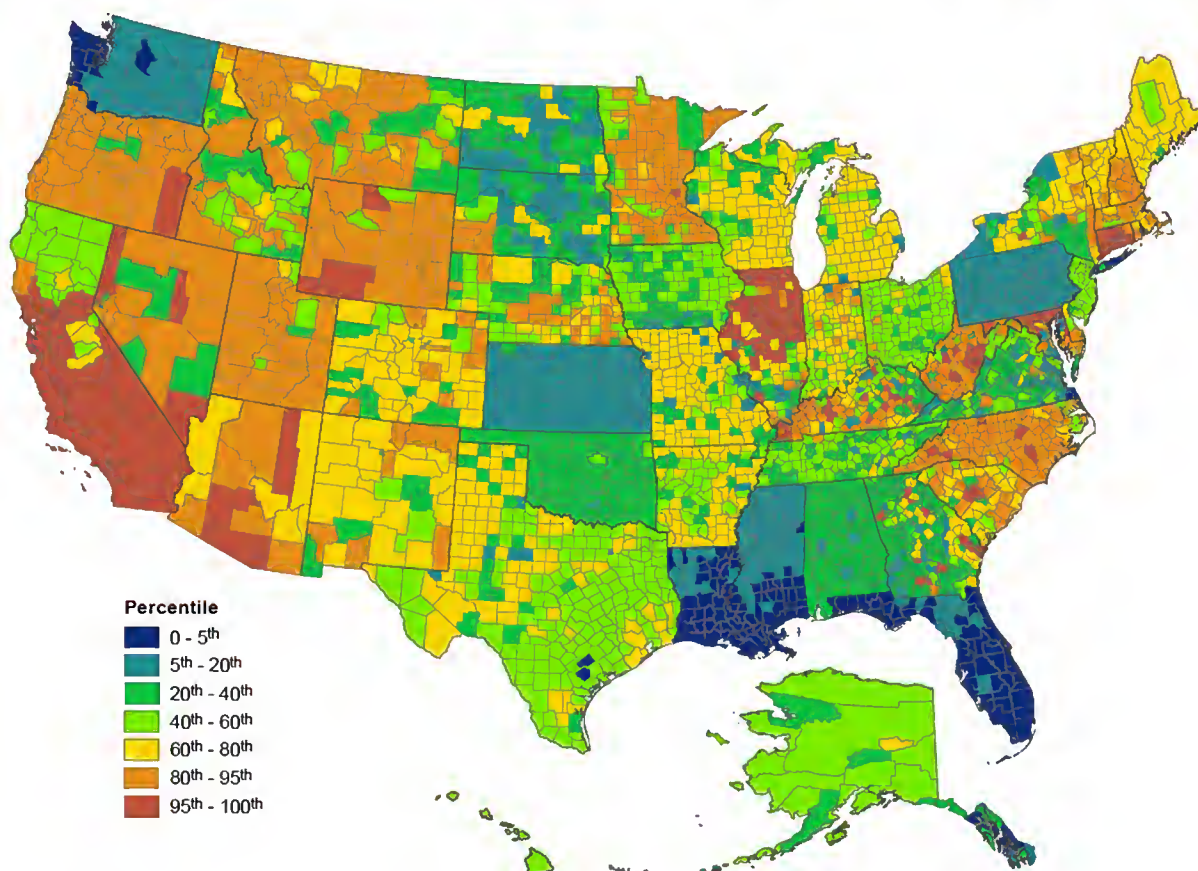
Map 1. Overall Environmental Quality Index by County, 2000-2005\*

\* For orientation to the maps, low index scores (EQI and domain-specific) indicate higher environmental quality, and higher index scores (EQI and domain-specific) mean lower environmental quality.





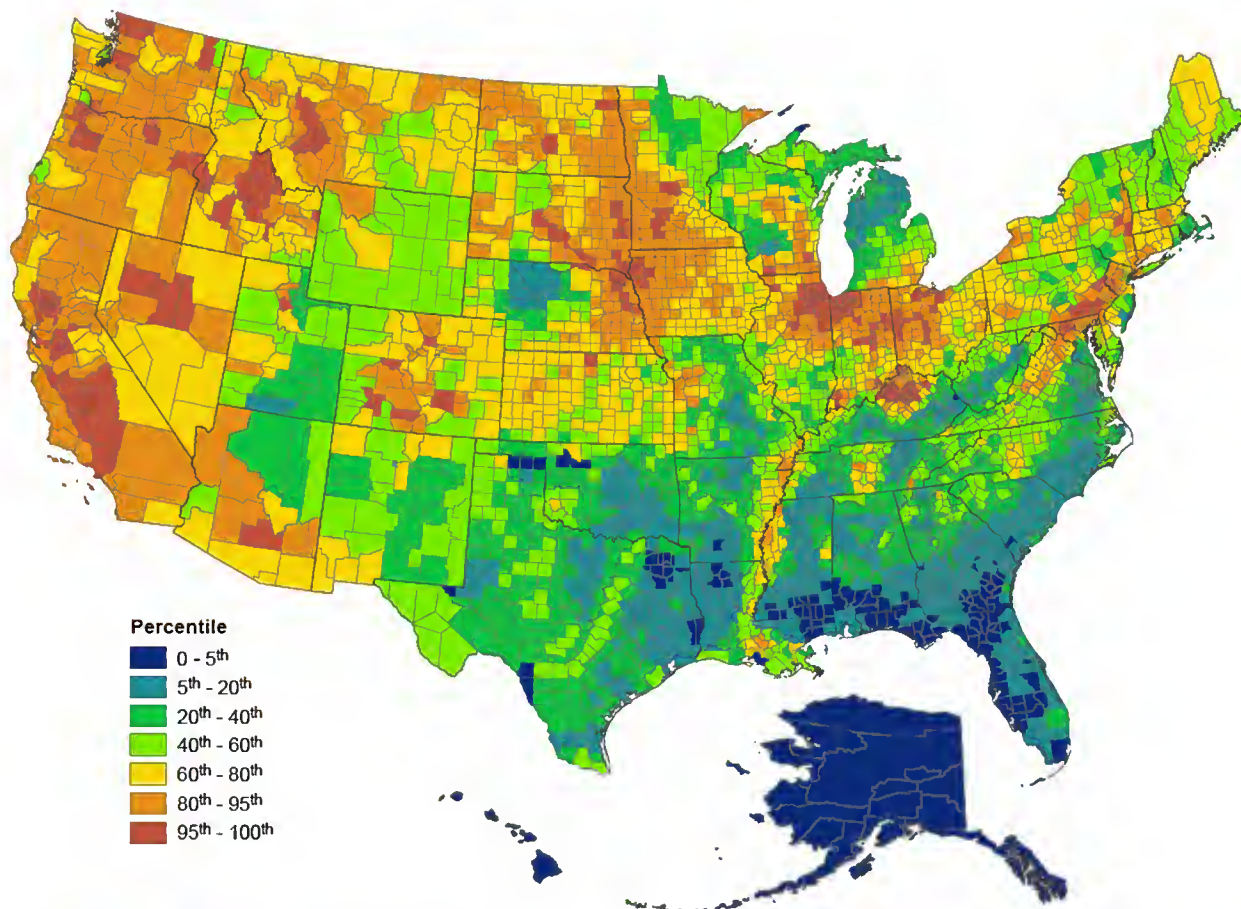
**Map 2. Air Domain Index by County, 2000-2005\***



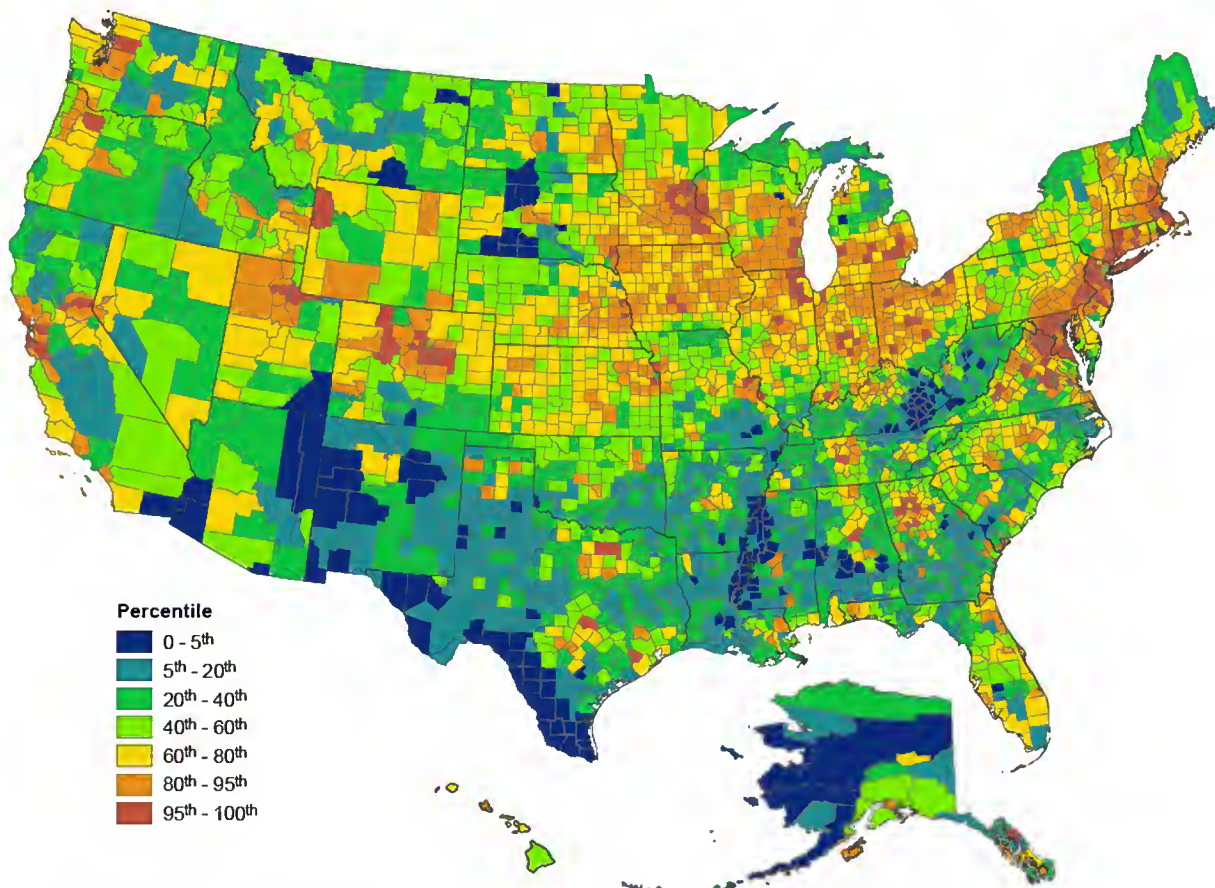
**Map 3. Water Domain Index by County, 2000-2005\***

\* For orientation to the maps, low index scores (EQI and domain-specific) indicate higher environmental quality, and higher index scores (EQI and domain-specific) mean lower environmental quality.



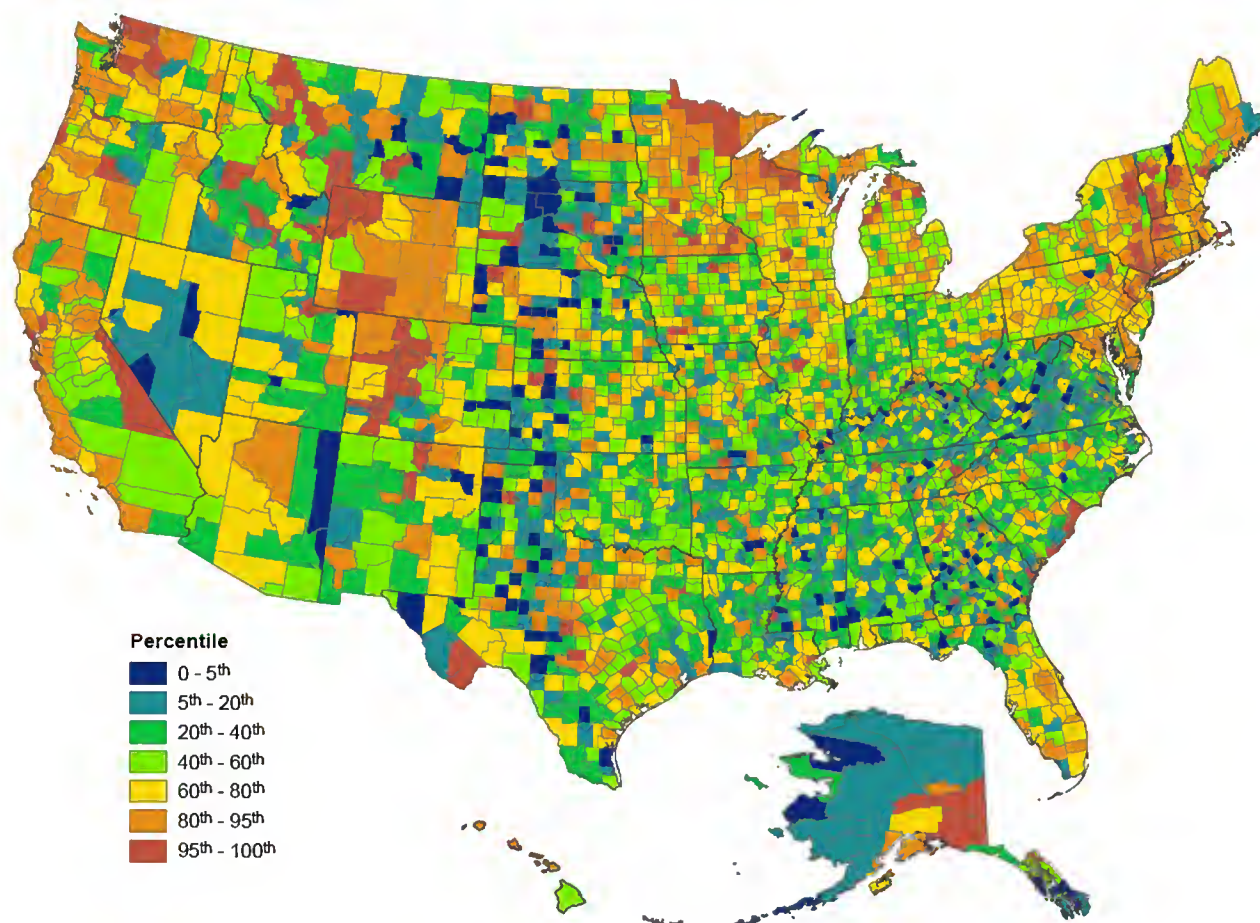


**Map 4. Land Domain Index by County, 2000-2005\***



**Map 5. Sociodemographic Domain Index by County, 2000-2005\***

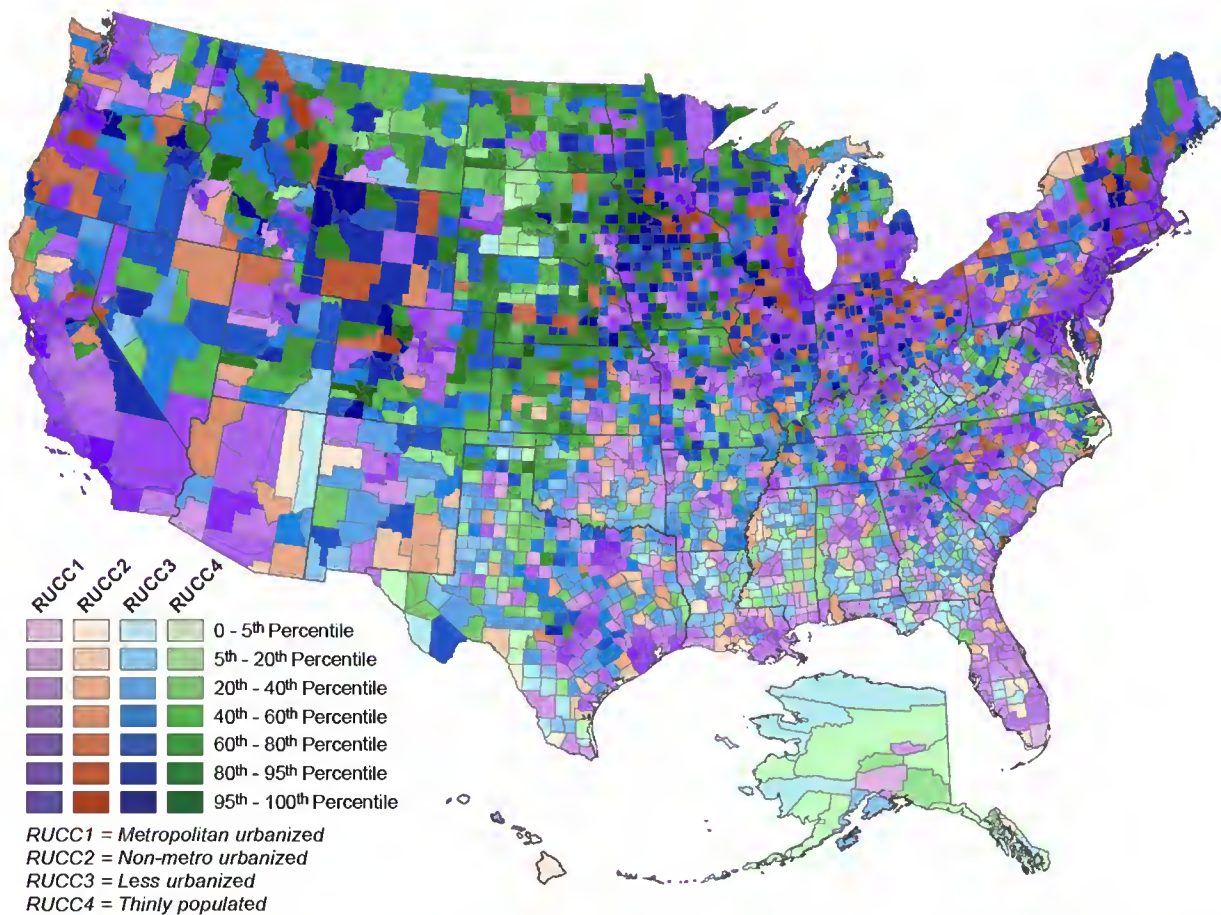
\* For orientation to the maps, low index scores (EQI and domain-specific) indicate higher environmental quality, and higher index scores (EQI and domain-specific) mean lower environmental quality.



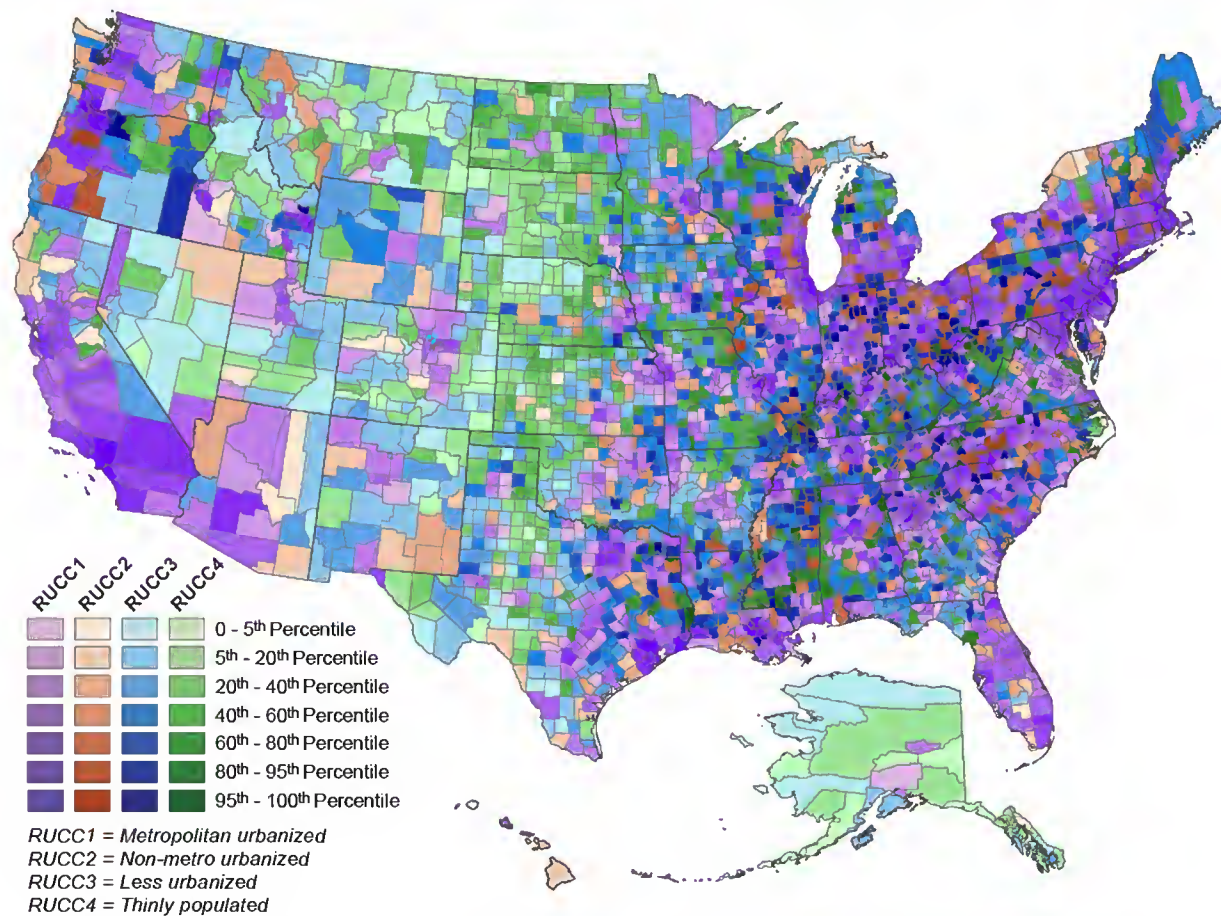
**Map 6. Built Domain Index by County, 2000-2005\***

\* For orientation to the maps, low index scores (EQI and domain-specific) indicate higher environmental quality, and higher index scores (EQI and domain-specific) mean lower environmental quality.





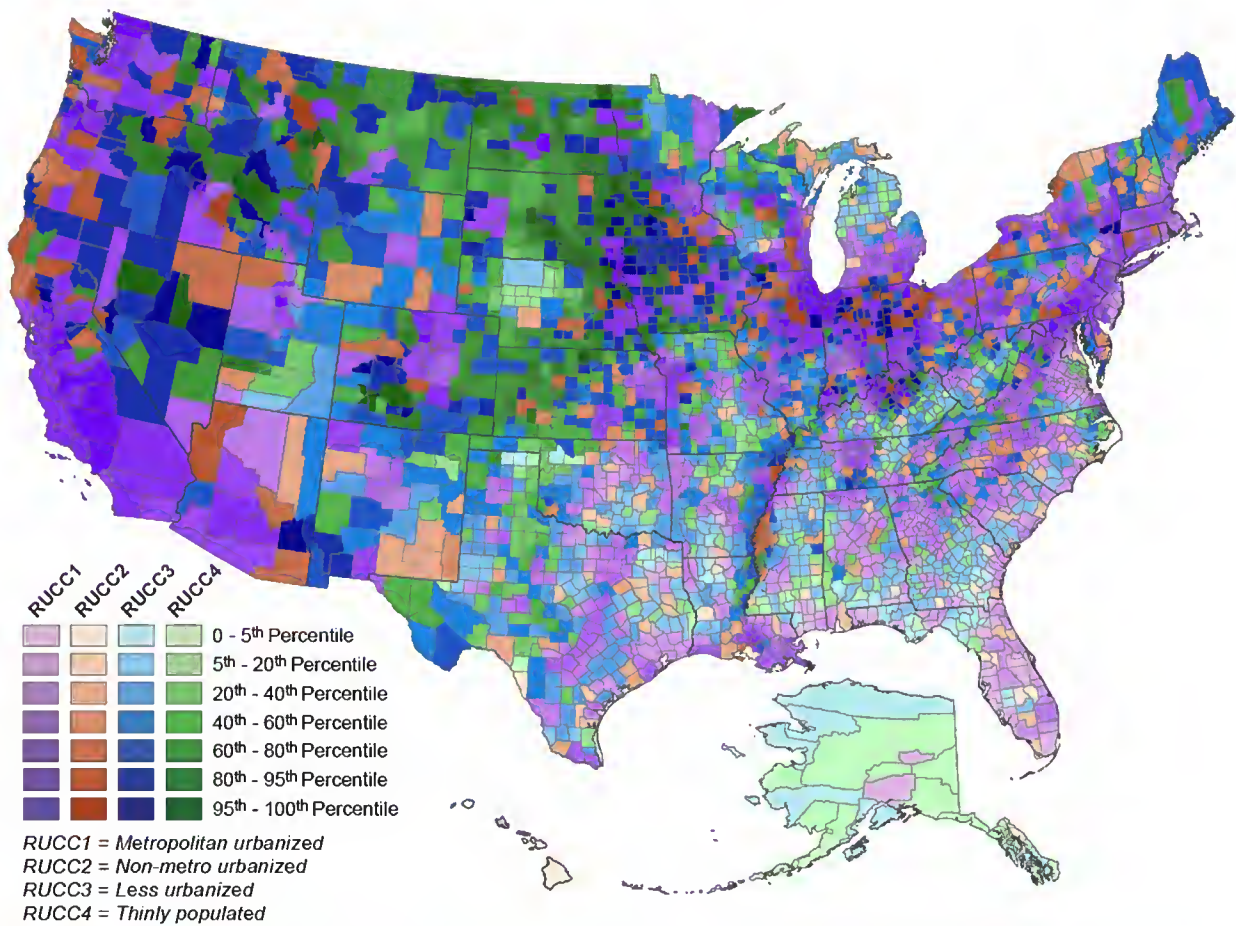
**Map 7. Overall Environmental Quality Index Stratified by Rural Urban Continuum Codes by County, 2000-2005\***



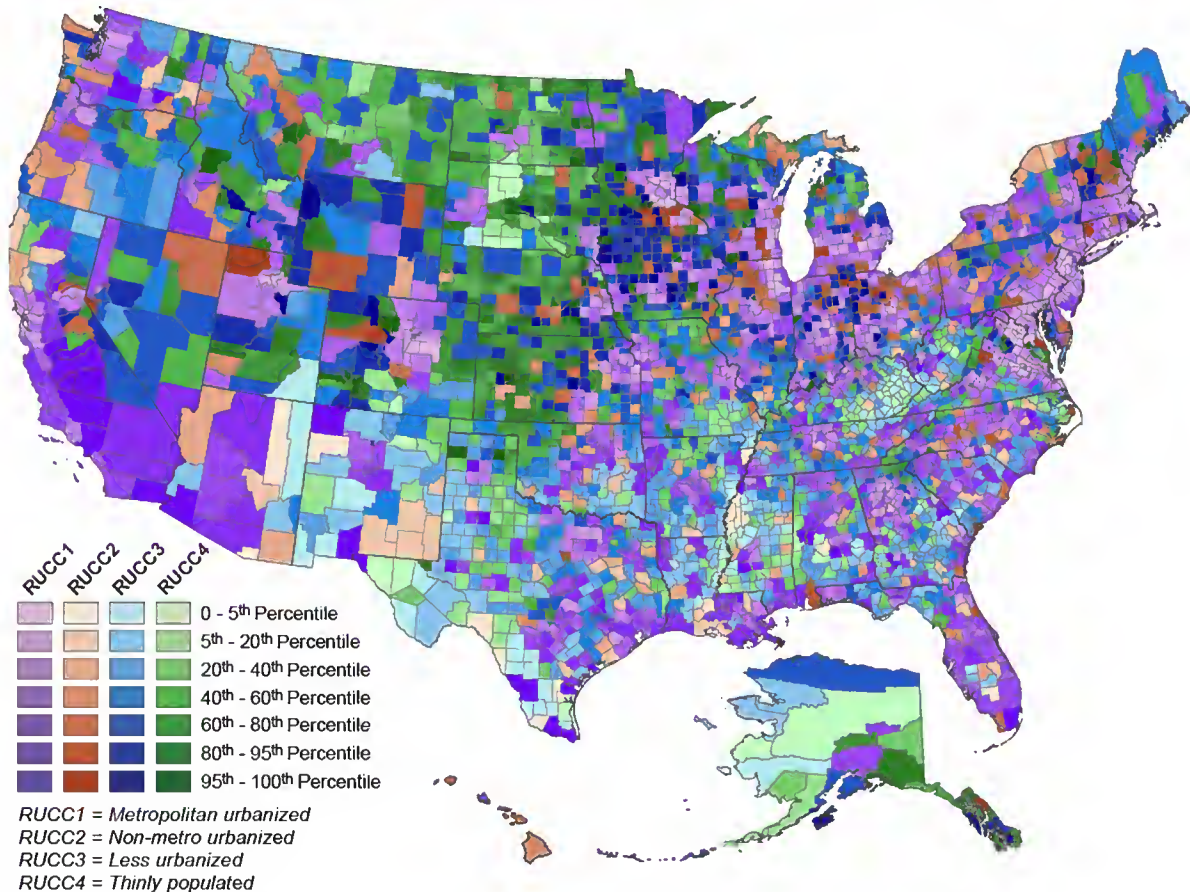
**Map 8. Air Domain Index Stratified by Rural Urban Continuum Codes by County, 2000-2005\***

\* For orientation to the maps, low index scores (EQI and domain-specific) indicate higher environmental quality, and higher index scores (EQI and domain-specific) mean lower environmental quality.





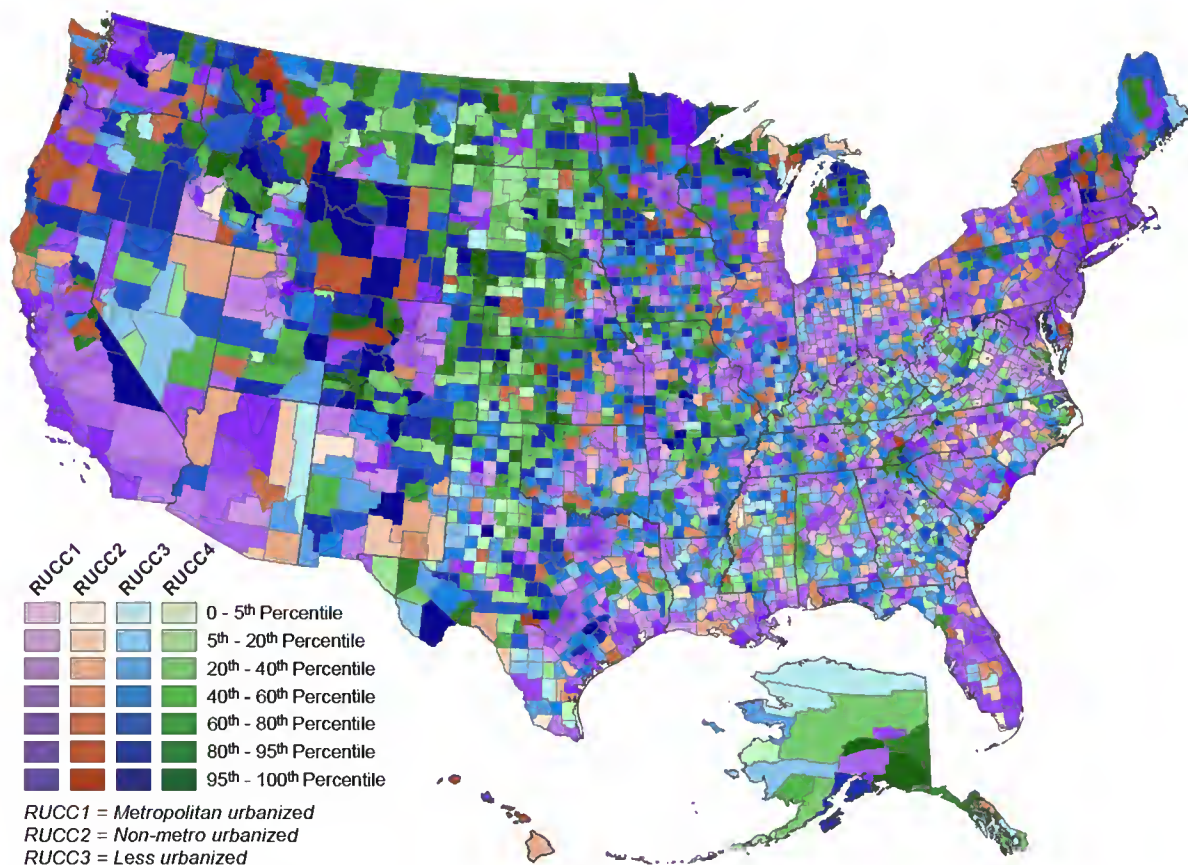
**Map 9. Water Domain Index Stratified by Rural Urban Continuum Codes by County, 2000-2005\***



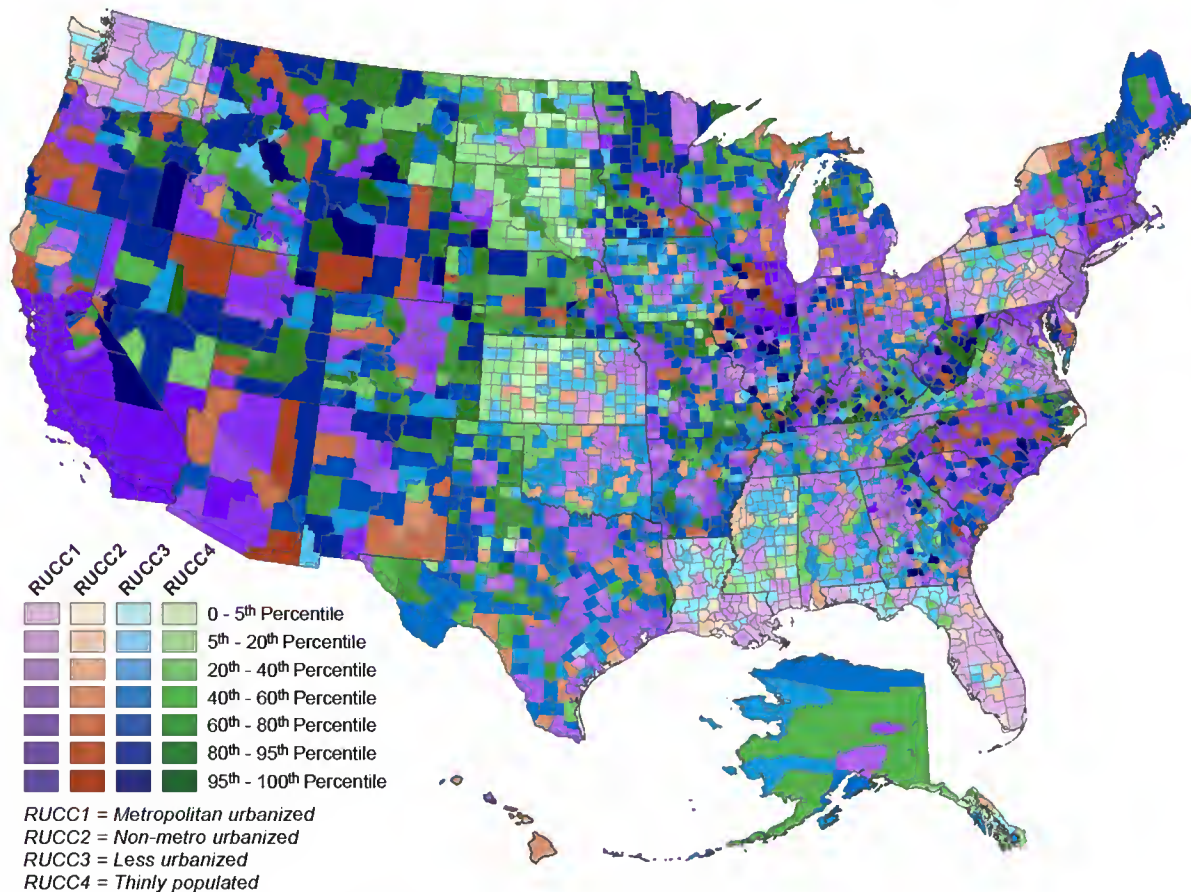
**Map 10. Land Domain Index Stratified by Rural Urban Continuum Codes by County, 2000-2005\***

\* For orientation to the maps, low index scores (EQI and domain-specific) indicate higher environmental quality, and higher index scores (EQI and domain-specific) mean lower environmental quality.





**Map 11. Sociodemographic Domain Index Stratified by Rural Urban Continuum Codes by County, 2000-2005\***



**Map 12. Built Domain Index Stratified by Rural Urban Continuum Codes by County, 2000-2005\***

\* For orientation to the maps, low index scores (EQI and domain-specific) indicate higher environmental quality, and higher index scores (EQI and domain-specific) mean lower environmental quality.



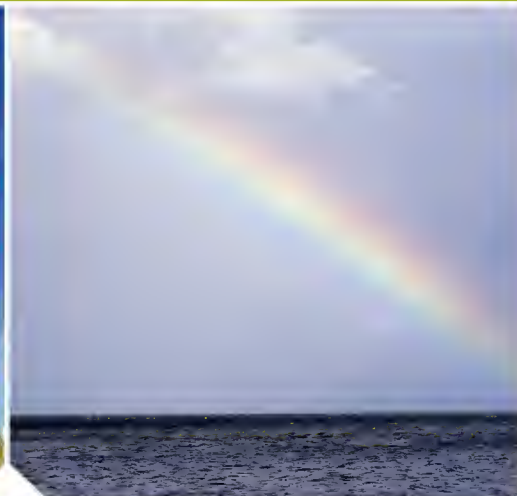
# Appendix V

## Quality Assurance

The approved National Health and Environmental Effects Research Laboratory (NHEERL) Environmental Public Health Division (EPHD) Intramural Research Protocol for this project is “Creating an Overall Environmental Quality Index,” with Document Control Number IRP-NHEERL/HSD/EBB/DL/2008-01r1. An internal EPA review of this report was conducted in August 2003 by Lisa Smith, NHEERL Gulf Ecology Division; Jane Gallagher, NHEERL EPHD; and Tom Brody, Region 5. An external peer review was conducted in July 2014 by Angel Hsu, Yale University, School of Forestry and Environmental Studies; Paul D. Juarez, University of Tennessee Health Science Center, Department of Preventive Medicine; and Peter H. Langlois, Texas Department of State Health Services, Birth Defects Epidemiology and Surveillance Branch.

The data sources used to create the EQI and the criteria used to select the data sources are mentioned in this report in Part II: Data Source Identification and Review. Additional information about the sources can be found in Appendix I and Appendix II. Table 1 provides the strengths and limitations of the sources used in the EQI.

Information about uses of the EQI, as well as strengths and limitations of the EQI, is located under Part V: Discussion.



# SCIENCE



PRESORTED STANDARD  
POSTAGE & FEES PAID  
EPA  
PERMIT NO. G-35

Office of Research and Development (8101R)  
Washington, DC 20460

Official Business  
Penalty for Private Use  
\$300



Recycled/Recyclable Printed on paper that contains a minimum of  
50% postconsumer fiber content processed chlorine free